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JUNE, 1894. VOL. III. NO. 6.

The Geographical Journal

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY.

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The
Geographical Journal.

No. 6. JUNE, 1894. Vol. III.

A JOURNEY ACROSS CENTRAL ASIA.*

By ST. GEORGE R. LITTLEDALE.

Having been bitten with a desire to procure specimens of that Central Asian rarity, the wild camel, and to travel through an almost unknown country across Asia to Pekin, Mrs. Littledale and I, accompanied by a fox-terrier, left England on January 31, 1893. Deep snow completely demoralized the train service to Constantinople, and the intense cold was a thing to be remembered. Leaving Constantinople by steamer, we stopped at Samsun for a few hours; hearing by chance that there was an English traveller on board another steamer, we concluded it must be Lord Dunmore. On paying him a visit, he handed over to us his Ladakhi servant Ramazan, who had been with him on all his wanderings, and who proved invaluable to us later on. The late Sir Robert Morier, with his usual kindness, had for the third time obtained for us permission to cross Russian Turkistan. On arriving at Batum, we found that the customs officials had received orders from St. Petersburg to assist us in every way, thanks to the kindness of Mr. Howard, Secretary of the British Embassy, who had interested himself most effectually on our behalf; the result being that our mass of baggage, guns, etc., was passed through unopened and without a moment's delay. In crossing Central Asia we met a host of old friends, whom we were delighted to see again. We also paid a hurried visit to the grand ruins of Samarkand, but the weather was too cold for sight-seeing. We travelled from Samarkand by tarantas. At Marghilan, General Korolkof took immense trouble trying to find our old servants, whom we wished to re-engage. Reaching Osh, we found waiting for us, at the club, Azim, our old chef, who

* Paper read at the Meeting of the Royal Geographical Society, April 9, 1894. Map, p. 540.

had been on two expeditions with us on the Pamirs, and who was described to me as being the best cook and the greatest blackguard in Central Asia. We were horrified to hear of the awful fate of Iris, a Jiguit who had crossed to India in 1890 with us. He volunteered to take a Russian dispatch from a post on the Pamir to Marghilan, some Kirghiz having previously tried and failed. Owing to the fearful weather his horse died, and on foot he fought his way for days through the snow; then his feet were frost-bitten, and, having fired away all his revolver-cartridges to keep off the wolves, he defended himself with his sword. His hand then became useless, and he was found lying in a dying state by some Kirghiz, who carried him to Marghilan, but too late, alas! to save his life. Thus perished one of the truest, bravest, and most faithful servants we ever had.

Our old friend, Colonel Grombchefsky, now Naichalnik at Osh, kindly arranged that we should be put up at the club, and took all trouble off our hands by organizing our caravan to Kashgar, consisting of thirteen baggage and five riding ponies, at the reasonable hire of eight roubles apiece. We were in despair about an interpreter, as ours had proved most unsatisfactory. While we were talking, I remarked to Grombchefsky that he was probably at that moment listening; walking quickly to the door, I flung it open, to find him with his ear at the keyhole.

On the 8th of March we left Osh. Nothing could exceed the kindness of Colonel Grombchefsky; he made arrangements that each night we should find sheep, firewood, and two yurts ready for us, doing away with all necessity of pitching our tents. Certainly the Russians are the most hospitable people in the world. There was a good deal of snow on the road between Osh and Gulcha. In the mornings the tracks were very slippery; but the sun had great power, and in the middle of the day the ice became slush. We met numbers of Kirghiz leaving their winter quarters at Osh, and going in the direction of Marghilan for the young grass; later on they return, and gradually follow the Gulcha river to their summer quarters on the Alai.

A couple of easy marches from Gulcha took us past Kirgil Kurgan to Suffi Kurgan; from thence we were obliged to carry two days' supply of firewood. We had been warned that we were not to attempt to cross the pass if a Jiguit, who had been provided, said the weather was doubtful; but next morning, all being propitious, we started for the Terek Davan. At first the ascent was gradual, but after the track had turned up a narrow valley the snow changed to ice, and it was bad travelling. There had been a partial thaw, the water had come down the valley over the snow and been frozen, and it was with the greatest difficulty we advanced. The bright sun on the glistening ice, which had formed into most fantastic shapes, made the scene most beautiful. We met a caravan coming down; the men said we should find it very bad higher

up. We had not much comfort to offer them as to the lower portion, having already seen one of our horses slide downhill a considerable distance in a sitting posture. A few weeks later the Terek becomes utterly impassable, and all caravans have to take the longer route by the Taldik pass and the Alai plateau until the ice in the ravine is melted. Before reaching the summit the valley opens out, and at Ravat there is a rest-house, an enclosed courtyard with sheds for horses, and two small rooms; the cook, of course, occupied the one with a fireplace, and we spent a miserable night in the other. The weather was bitter even at Gulcha; a glass of water would freeze during breakfast or dinner. Next morning we followed a steep icy path to the top of the pass; height by aneroid, 13,350 feet. We were badly in want of felt shoes, as our shooting-boots were not adapted for the low temperature. At this point our poor little fox-terrier decidedly thought life was not worth living.

Down the other side the descent was not so steep; the water there had apparently again flowed over the snow and frozen. With a toboggan we could have had a charming run of about ten miles. Our yurt was pitched at Kok Su, in a delightful grassy spot, with glorious views—a perfect ibex country. Close to our camp there were some curious circles formed with stones; the Kirghiz said they were graves of a giant people before their time. The river had washed away the bank, and half a circle was gone. Climbing down, I found some bones exposed. I scraped away and got the skull, which after dark I smuggled into camp, fearing to arouse any superstition. To Irkistan, the frontier post of Russia, was a longish march, but the scenery quite repaid us for any fatigue; the mountains were magnificent. In a couple of marches we reached Ulukchat, the Chinese frontier post, and we noticed at once a different type of feature among the Kirghiz. The Chinese amban was civil, and wished to provide food for the horses; but I explained that they were all hirelings, and it was unnecessary. The old gentleman had been kicked on the ankle by a horse, and he was most anxious we should prescribe; in our ignorance we did our best.

The second march after leaving the fort was through the most desolate and weird scenery imaginable; dark narrow passages (you could hardly call them anything else), where in many places it would be impossible for two pack-animals to pass, led through hills sometimes of red clay, at others sandstone weathered into the most grotesque shapes. It was like a goblin's den in a pantomime. We had noticed for some days a misty appearance in the sky, which completely hid the sun; this we attributed to dust from the desert. We reached Kashgar on March 22, having taken fifteen days, and marched 250 miles from Osh. Mr. Macartney most kindly put us up, and helped us in many ways. We are also deeply indebted to Monsieur Petrofski, the Russian political agent; he and his wife both tried hard to dissuade Mrs. Little-

dale from attempting the journey we proposed, but when they found that we meant business, M. Petrofski's unique knowledge of the country and its ways made his advice and assistance invaluable. Our precious interpreter was drunk in the bazaar, and that was the last straw; so we packed him and the cook, who was no better, home again. And there we were, without cook or interpreter. Mr. Macartney got us another Ladakhi, Rozahun by name; but neither he nor Ramazan could speak a word of English, and my Hindustani was decidedly elementary. When engaging him I promised to give him the same wages as Ramazan; the latter meekly remarked I had never promised him anything, and at the same time he took the opportunity of asking where we were going. It shows the faith Englishmen have inspired in the natives of India when a man would be willing to start off on a long journey, with perfect strangers, without knowing where or for how long he was going. We also engaged a man who spoke Turki and Chinese. If I wished to ask a Chinaman anything, I first had to speak to Ramazan in Hindustani, who translated it into Turki, and our interpreter retranslated it into Chinese; so every question involved six translations before I received the answer, which frequently had nothing in common with the question.

We purchased in Kashgar about 5000 roubles' worth of silver yamboos, known on the China coast as sycee silver; they were chunks of silver of various weights, no two of a size, and making nearly two pony-loads. What can be expected of a country where such a barbarous currency exists? In making a bargain, it was not only requisite to arrange the weight of silver to be given, but also whose scales were to be used—a very necessary stipulation, as with the pair I had there were three different arrangements by which the scales could be fraudulently altered to suit yourself, as you might happen to be a buyer or seller; and then there was the endless question as to the quality of the silver. I always, if possible, contracted that my scales were to be employed, and, whenever their accuracy was impugned, triumphantly pointed to a stamp, which I was informed and believed was that of the Taotai of Kashgar; months after I discovered that my much-vaunted stamp was simply the price of the scales!

On March 29 we left Kashgar with three covered carts, each having one horse in the shafts and three abreast in front; the carts had large wheels. By putting our tents on the bottom and our bedding above, and by arranging curtains to keep of the dust, we really made them not uncomfortable; they travelled so slowly we were able to read and play piquet. Sometimes we would travel by day, sometimes by night, and occasionally both day and night. The owners of the horses seemed to think that an extra feed of corn was quite equivalent to a rest. In this remote part of the world the horses are made to wear bearing-reins, which the carters tighten as remorselessly as the most orthodox London

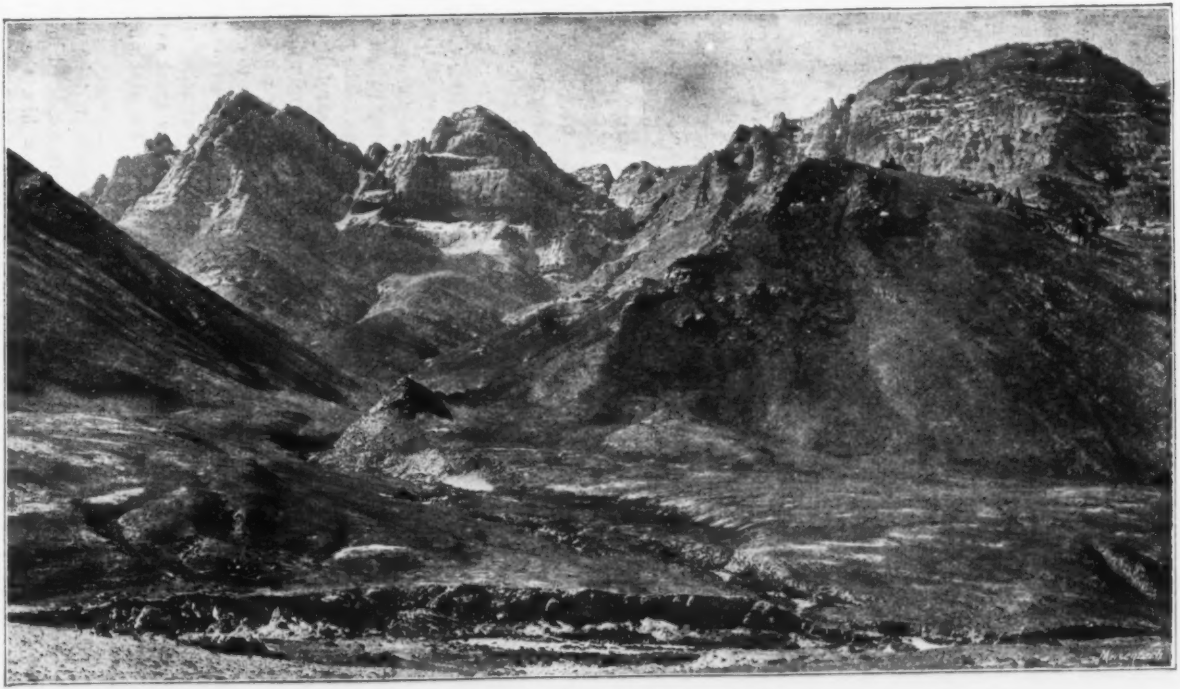


FIG. 1.—KOK SU. TIAN SHAN.

coachman. We usually slept at one of the Chinese official rest-houses, which were all very much alike. A large gateway, often having a room over, leads into a courtyard about 80 yards square, with sheds for horses; another gate leads into an inner yard with two or three suites of rooms. Each suite was usually a room in the centre, with a smaller room on either side; the windows were covered with paper, and the furniture consisted of a rickety table and two or three still more decrepit stools, everything half an inch deep in dust. The entire house was made of mud. After a week's hard rain, not a wall, house, or caravanserai would be left standing—they would simply melt away; but rain in this country is almost unknown. Owing to the thick, dusty haze we hardly ever saw either sun or stars, and although we had the high range of the Tian Shan close to the north of us, I can only recall one occasion on which it was visible. We tried by offering rewards to get some old manuscripts; an illustrated book was brought, which our Chinese interpreter pronounced to be three thousand years old. On examining it, I found a picture of a frigate, and another of a man filling his wine-glass from a decanter; so, in spite of its age, I did not buy.

At Aksu a very large proportion of the Turki population had goitre; I did not notice the malady amongst the Chinese. We passed a considerable number of Chinese soldiers on their way to Kashgar; they were straggling along the road in twos and threes, without any pretence of military discipline, and wretchedly armed. Nobody in their senses would dream of pitting them against European troops. Whenever we saw any quantity of these gentlemen approaching, we pulled down the curtains of the cart, as we wished above all things to avoid a row, and they have the reputation of being very bumptious when in overwhelming numbers. On one occasion, seeing an Afghan trader break a chatti over the head of our caravan bashi, I stepped forward to stop the fight. The Afghan declared he had not been paid for something; our men vowed he had stolen their money. On his mouth being prized open with a bit of wood, there was the missing chunk of silver. The people were very inquisitive, examining all our belongings most carefully. A Chinaman wished to know the use of a safety-pin; so I securely pinned the two sleeves of his coat together, and then proceeded to box his ears, much to the delight of the spectators, who repeated the joke to everybody who came afterwards. We passed, on one occasion, a native wearing a heavy iron collar round his neck, to which was attached by a chain a bar of iron about five feet six inches long, and as thick as my ankle; he had to wear it for the rest of his life for stabbing a Chinaman.

On arriving at Kuchar, I tried at once to get a guide to take us to the tombs at Mingui. No one would go; the difficulty consisted in the fact that the man Captain Bower had bribed to show him the road afterwards got two hundred strokes by order of the amban for having

done so. I bearded that worthy in his den, demanded and was promised a guide; it was noised abroad that I had received permission, and then half the town wished to go. I arranged for some men and horses to be ready at daylight, so that, if the amban broke his promise, I should be independent. Next morning no guide from the amban was forthcoming, and we started. We went by a short cut, which proved a couple of hours longer than the ordinary road, and when we arrived at Mingui the promised men were waiting for us, having come the shorter way. The caves are chambers cut out of the sandstone and clay which form the precipitous sides of a valley, through which rushes a rapid river; a great many of the caves are quite inaccessible from below without long ladders, or from above without a rope. Most of those I saw had arched roofs covered all over with endless pictures of Buddha; on one roof I counted twenty-four rows of thirty-six figures in each row. The walls had more Buddhas, and faces of a Chinese type; opposite the doorway was usually a buttress, on which was carved a large figure of Buddha, with nearly always a tunnel round at the back. On a steep rocky promontory there was an opening, entering which we scrambled up by aid of holes for the feet and hands, and found ourselves in a gallery; to the right were a succession of tombs, and to the left an opening in the rock, through which we looked at the river foaming below. I should dearly like to have had a few quiet days' digging with pickaxe and shovel. Evidently somebody else had been of the same opinion, for there were traces of the ground having been disturbed in some of the chambers. Rozahun, who accompanied me out to the cave, said there were plenty of similar ones in Ladakh.

We arrived at Kurla on May 1, the journey of 650 miles from Kashgar having been rather uninteresting. Wherever there was water there was vegetation, and sometimes cultivation, but there were long stretches of monotonous desert country. We immediately set to work to organize our caravan. With the aid of the aksakal we purchased twenty ponies, which with their pack-saddles, ropes, picketing-pins, etc., averaged £3 apiece, and twenty donkeys, which with their fittings cost £1 2*s.* apiece. We engaged six men to look after the animals; we took five months' food for the men; we also hired twenty-five or thirty donkeys to go as far as Lob Nor, on which we piled as much grain as they could stagger under; we also hired a few extra donkeys to go with us for a week, to save our supplies of grain.

I experimented here and at Kashgar with the sextant and artificial horizon lent by the Society. Unfortunately, after receiving a few lessons from Mr. Coles, an accident confined me to bed for several weeks, and I was thus prevented from making myself as competent an observer as I could have wished. Nevertheless, I had obtained sufficient knowledge to enable me to make good use of the instruments lent by taking observations for latitude and time. Jolting in the tarantass had ruined the

glass of the artificial horizon, making observations very difficult except on calm evenings. Mrs. Littledale volunteered to note the time by my watch of the sextant observations, and I am afraid it proved to be no small addition to her fatigues, having to stay awake sometimes for hours while I tried under the lee of the tent to catch the stars on windy nights. Finally the prismatic compass succumbed to the accidents of travel, and had to be patched up with silk; therefore I hope allowances will be made, and my first attempt at map-making judged leniently. Making our arrangements with all possible speed, it was May 10 before they were completed. The aksakal, a kind of petty judge, wished to come to Lob Nor with us, and as we hoped to make him useful in getting a guide, we agreed at once. At starting we found that the only men who understood anything about packing were our two Ladakhis. Before engaging any men, I made them thoroughly aware of the fact that they were to walk the whole distance; I told them that if, later on when our stores decreased, we found we had spare animals, then they might ride. After leaving the oasis of Kurla, we crossed some barren country, and the second day reached a sluggish muddy stream, about 30 yards wide and very deep, which eventually joined the Tarim river. Some people from the Lob passed our camp in dug-out canoes. Going down stream, they told us they would reach Abdul in four days; our caravan took sixteen.

On the seventh day we came to where the Chinese are building a new city, 300 yards long and 200 broad. The only name I could hear was Yangi Shahar, new town. Like every other town in that country, it was surrounded with a high wall of mud; they were building it by filling up a wooden framework, which was raised as the mud got hard below. I arranged that Ramazan and the aksakal should go to Chaklik to get a guide, some more Indian corn, and camels or donkeys to carry it for some distance along the Altyn Tagh, while we went direct to Abdal to let the caravan rest. There was good grazing most of the way; the young chi grass was springing up well, and our animals were putting on flesh; but the vegetation is confined to the neighbourhood of the river and a mile or two on either side; beyond was hopeless desert. We had to cross the Tarim twice; our animals swam across, and our baggage was ferried over in canoes. We lashed a couple together side by side, so there was no fear of an upset. As we got nearer Lob Nor the weather became hotter, and at night the temperature did not often go lower than 80°. On May 27, at Kurgan, we caught our first view of the Altyn Tagh. High, desolate, and barren they looked; as the sun rose they faded away. On the following evening a strong gust of wind struck the tent, which was followed by others till there was a furious gale blowing, that lasted all night and the following day. By placing sacks of grain on the tent-pegs, the tent weathered the storm. Nearly all our stores had been ferried across on

the previous afternoon, but it was quite impossible, in the teeth of the gale, to take the remainder of our things over or cross ourselves, though the river was only about 70 yards wide.

We reached Abdal, which is a miserably poor village consisting of four houses and about twenty inhabitants, on May 28. The water of the Tarim here, curiously enough, was very cold, though three days previously it had been warm, and there had been no change in the weather to account for it. When the natives came to pay their respects, they put their hands below their waists, and then bowed in a manner very suggestive of sour apples. Their features were in several instances strangely Irish in type. They told us that the mountains we saw were called Chong Tagh, and that the real Altyn Tagh are far to the south. Ramazan and the aksakal arrived from Chaklik; they had purchased some grain, which came by boat. Neither camels, ponies, nor donkeys were to be procured there; every animal had been hired to carry supplies to some natives who were mining on the other side of the Altyn Tagh, and whose animals had died. The guide they brought, on being cross-questioned, proved a fraud, and only knew the road to Gass; so we sent him back, and relied on an Abdal man who had once been to Saitu. We arranged that twenty of the hired donkeys should go on at the hire of three and a half seers a month apiece, with two men and a boy to look after them.

We left Abdal on June 3, having given presents to everybody who had been of any use to us, and to many who had not. At first all our animals were carrying very heavy loads of Indian corn, but with the numbers we had to feed the daily consumption was large, and we reduced the loads of the weaker animals first. To avoid some of the marshes we retraced our steps a few miles up the Tarim, and then turned south-east along the edge of the marsh. The travelling, in places, was very bad; the earth looked as if it had been steam ploughed, harrowed to break the furrows, and then baked by the sun almost as hard as iron: it wore the shoes of the ponies very much; if they chipped off a piece of earth it rang when it fell, like metal. We camped by the edge of the swamp; the water by the shore was very salt, but by wading in some distance we got some just drinkable. The Kalmuks had marked the way across the desert by forming here and there bundles of reeds into tripods. We saw the Lob Nor swamp stretching away, a green patch, far to the east. At Abdal the natives said the river flows about three days' journey and then sinks into the sand, and that there are no permanent habitations beyond Abdal; there are distinct evidences of the swamp having been at one time much larger than it is at present, and, judging from the number of the roots, there must have been a considerable forest where there is nothing now but arid desert.

The houses of the people of Lob are primitive: a rough framework

is made of logs tied together, against which are placed bundles of reeds standing on end, which are fastened to the logs; the roof is the same, and, as high winds are prevalent, they are frequently laid flat. The Altyn Tagh were very distinct, and did not appear to be one-third the distance away that we knew they really were; their higher summits were covered with fresh snow.

We had now a long waterless stretch to the mountains, about fifty miles as the crow flies. At Astchi bulak there was grass and some water, but too bad even for the donkeys. We marched up a gradual slope of gravel for about ten hours, then stopped to rest and feed our animals. When the moon rose we started again: the night was cool, and we travelled fast, and reached our camp at the Kurgan bulak about noon

FIG. 2.—LOB NOR (AFTER PRJEVALSKY).

the following day. The stream was excessively bitter, but we found a spring, the water of which, though bad, was fit to drink. Shortly before we reached the Kurgan bulak we passed a stream of deliciously cold, muddy water: it was from the melted snow, our guides said; they had never seen any water there before. The sand-grouse had found it out, and were collected near in thousands. Some of the donkey-men before they reached water had been marching for thirty-four hours with only one rest of two hours. We had now attained an altitude of about 6600 feet, and the weather was much cooler. We marched a couple of days up the valley, in the bottom of which springs of bitter water were numerous, and there was plenty of chi grass for our animals; the hills on each side were clay, and devoid of vegetation. There was an old

ruined fort, at the point where we left the road used by the Kalmuks going to Tibet. Our men said, whenever Kalmuks were spoken to about this road they always spit to show how they disliked it. After crossing the pass, a long distance has to be travelled before water is found, and it is customary among the Kalmuks to employ one animal out of every six or eight to carry water for the others. We turned more to the east, still following up the valley, and the grass grew scarce. It was here we first saw the tracks of the wild camel. The country gradually assumed a more Alpine character, and we had several small passes to cross; the rocks were covered with loess, and the coloration of the mountains then became very peculiar,—the lower part was light brown loess, out of which rose cliffs of black rock and, a little further on, very red granite. The contrasts were startling. We were now, on June 10, at an elevation of 10,862 feet, and we had a long march in drenching sleet and rain, and all the men shrivelled up at once; they are not used to it, and the rain made travelling most disagreeable. Owing to the usually dry climate there was deep dust everywhere, which quickly became slippery mud, fatiguing to both man and beast. We were marching parallel to the Altyn Tagh, along its northern slopes; the summits rose 2000 or 3000 feet above us. We had to surmount a succession of ridges and valleys, water and grass being scarce. The first of our horses gave out here—a short-legged thick-set strong animal, but he would not eat grain, and grass was too scanty: we gave him a chance for his life by leaving him beside a spring where there was a little grazing; we felt rather sad next morning, when we marched away and left him to his fate.

I followed down one of the valleys to try for wild camels. The mountains were very savage and grand; the black colour of the rocks gave them a very gloomy aspect: they gradually sink down into the desert, and, finally, little peaks are seen peeping up through the sand. The following day, June 14, we reached Galechan bulak. The Altyn Tagh have mostly got a thin veneer of loess: the tops are bare, but lower down the coating of loess becomes thicker. From the deep ravines formed in the loess by water, one might suppose that the rains are heavy and frequent; but, judging from the channel our scanty morning tub when upset cut in the soil, one realizes that a little water makes a great show. A couple of days later the mountain ahead became impassable, and we had to turn down to the desert and skirt along the base of the hills. Water became very scarce, and there was no grass; there were a few low shrubs, on which our beasts had to do the best they could, and, as they rarely got water oftener than every second day, they lost flesh rapidly, and, owing to the lower elevation, the heat was greater, and their sufferings from thirst were increased. Our guides were most unsatisfactory, and we could not trust them in any way, their palpable object being to wreck the expedition. At one place, having vowed and declared there was no water, Ramazan caught them going secretly to a

spring in the night, the existence of which they had previously denied. I climbed a peak, and with my telescope swept an immense extent of desert; I could see no camels, nor could I see any sign of a range of mountains marked on the Society's new (unpublished) map of Tibet as branching out from the Altyn Tagh and running north-east.* But far away to the north, probably 40 or 50 miles, there was a range of sandy hills running nearly east and west. The men stated that the desert route to Saitu, which is only possible in winter, follows along their southern side. Marco Polo, in describing his journey, does not say which of the two routes he followed, but if he chose that by the mountains the country must have dried up enormously since then, for we did not find water in anything like the number of places he did—I think he mentioned twenty-eight. A couple of days later we caught sight of the snowy peaks of the Anembarula Mountains, and we then felt independent of our rascally Lob Nor guides. We were continually being delayed by the straying during the night of some of the animals: the poor beasts used to wander to try and find something to eat; and the men who were supposed to watch them were doubtless curled up in their sheep-skins, and no reward or punishment that we could devise would stop it.

Mrs. Littledale, a couple of men, and myself usually went ahead of the caravan, on the chance of stumbling across game. Seeing the fresh tracks of camels, I with one of the men followed them up, Mrs. Littledale and the other man going to try and find water for their horses, for they had had none since the previous morning. Doing no good with the tracks, we hurried on. Eventually I saw Mrs. Littledale in the distance, waving her handkerchief; I thought she simply meant to tell me that they had found water, so I went on taking bearings with the prismatic compass; finding her still waving, I pulled out my handkerchief, waved an answer, and returned to my compass. I then saw her frantically flourishing a handkerchief in each hand, and I realized that I was urgently required, and my footsore pony had to put his best leg foremost. Mrs. Littledale told me there was a camel on the other side of some rocks, and that the guide had left her half an hour before. On looking over the rocks I saw the camel half a mile away on the plain. I had just begun to crawl towards it when it galloped in our direction; I had a long shot, and mortally wounded it. I had just reloaded when another camel, which up to that time I had not seen, followed its companion's steps, only to meet the same fate. It turned out that the guide had seen the camel, and, wishing to shoot it before I arrived, had made a long round, the wind being then in the wrong direction; just as I came the wind shifted, the camels smelt him, and galloped past me. The men said that one of the camels was thirty-five or forty years old; Mrs. Littledale, who tried to eat some of it, saw no reason to doubt that statement.

* The necessary correction has been made in the map of Tibet, which will be published shortly.—Ed. *G. J.*

Two days after I got a couple more, so one of the objects of the trip was fulfilled.

We had several more days of desert, with little or no water and grass. One afternoon, after the daily march was over, I fancied I saw through my glass a faint greenish patch on the mountain-side, and as our water supply was at a very low ebb, I climbed up to see if I could find a spring; not finding what I sought, I thought, as I was halfway up, I might as well climb the rest, and see what was on the other side. When I reached the summit I found it was the top of the Altyn Tagh. Stretching away to the south was a great desert plain. At the base of the mountains, I should think about 4000 feet below, the sand was dark coloured, further away it became yellow, and I could see the dry bed of a stream where some water had evaporated, leaving a salt deposit. Away to the east, about half a mile, there was a wild yak close to some snow; but I had no rifle, and there was no time to get one before dark. On my way down I found under a rock a patch of snow, where apparently all the feather population came to drink. After quenching my thirst, I carried down to the camp, in my handkerchief, a mass of snow, feathers, and dirt; when melted it did not by any means prove to be an ideal drink, but it was without salt.

On June 24 we were close to the Snow Mountains, and at Nanambal we camped by a considerable stream with good grazing; there was a yurt there, the inhabitants apparently consisting of two men and two women; directly they saw us they jumped on their horses and bolted up the hillside. They returned very gradually; I went forward to try and talk to them, but as I advanced they retreated. Then Mrs. Littledale tried her hand; she thought she would get on better with her own sex, and she used all the blandishments she could think of. The women eventually turned out to be two young men, lamas; what they thought of her I don't know. It took us quite an hour to establish friendly relations; we were particularly civil to the young lamas, as we hoped to enlist them as guides, but at the first opportunity they slipped away. These were the first inhabitants we had met since leaving Lob Nor. I offered heavy bribes to the two Chinamen if they would show me a pass over the mountains, but the answer I received was they did not know any road; it was only some time afterwards that I discovered that our interpreter, who was the greatest coward that ever stood six feet in his stockings, had played us false; he was so thoroughly frightened that his only wish was to lead us to some Chinese town where he could desert. The Lob Nor men refused to come any further, and we took one of the Chinamen, hoping to pick up somebody who would take us across the mountains; but the further east we went the higher they got, and I do not think in that part there was a pass across the range. We had now left the extremely dry country behind us, and were in a more fertile district. We really hoped our water troubles were over, but

after we left the mountains we marched across a broad plain and then down into the yellow sand. We went on and on; the Chinaman persisted we were all right; horses and men began to be played out, and a more hopeless outlook for water could scarcely be imagined, when suddenly, on surmounting a hill of drifting sand, we saw down below us in a valley a vividly green patch of grass and a spring; the water which sank into the gravel at the foot of the mountains reappeared here. We had decided that as we were, owing to the treachery of our interpreter, now so near Saitu, it would be better to go there, procure a guide and a fresh supply of horseshoes, as we had used more than we counted upon, and then strike into the mountains again. The evening lights were beautiful, the brilliant green of the valley contrasting with the different tints of yellow and brown sand and the snow-peaks of the Altyn Tagh; it was the only pretty scenery we had seen since crossing the Tian Shan fifteen weeks before.

The day before reaching Saitu our path for seven or eight miles followed an embankment which was four or five feet high and about ten yards across; where our path branched off, the embankment continued as far as we could see. I never heard that the Great Wall of China extended beyond Suchau, but this certainly much resembled parts of the wall that we afterwards saw, and if it was not the wall I am quite at a loss to say what its use could have been. We invested in some sheep, but we did not own them long, for during the night the wolves made themselves merry at our expense, and a bone here and a bit of skin there was all there was left of them next morning.

On Sunday, July 2, after winding through fields and gardens, we camped on a green meadow just outside the walls of Saitu, and our camp was at once surrounded by Chinese, who were extremely curious to see Mrs. Littledale. My first step was to buy horseshoes, after which we felt quite independent. I then went to call upon the head amban, who commanded the soldiers. He was very civil, but laughed at the idea of there being a road to the mountains; at this time of the year, he said, there was no water, and the horses would all die. He requested us to return in the winter, and he would help us. I then called upon amban No. 2, governor of the town, who stated that the road to the mountain was at this season quite impassable; owing to the melting snow, the rivers were unfordable. He had just heard that some Kalmuks had had their camels swept away and drowned; how did I expect my donkeys to cross? I replied that I had nearly forty, and the loss of two or three would not matter. Suppose your wife was drowned? Here was a question bristling with difficulties, so I turned the subject. No. 3 was less polite, and relations were speedily strained. All were determined that we should go by the main road; they enlarged freely on the danger from robber tribes. Negociations went on for three days. I announced, and stuck to it, that, guide or no guide, I should start on

the 6th. Things looked very black for our men, who, exhausted with their journey, now in addition were terrified at the tales they heard of the Tonguts, and absolutely refused to go any further. One of the reasons advanced was, that we had given them water out of a cup that our dogs had used. Mrs. Littledale used to carry water especially for our fox-terrier and a Kalmuk dog in an Indiarubber hot-water bag strapped on to her saddle, and they drank out of her cup, and one of the most trying things on the expedition was to have to refuse water to these poor dogs. One day, when the only water any one had left was a small quantity which Mrs. Littledale had in her water-bottle, the caravan bashi, who was terribly exhausted, felt the bottle and asked for a drink; she gave half a cup to each man, and glad enough they were to get it, notwithstanding their Mahomedan tenets. Our two Ladakhis and one Kulja man alone remaining faithful, I told Ramazan that he was to see that every man had a big supper, and then he was to talk to them, expatiating upon the enormous wages they were receiving, and the presents they would get in addition, and how awkward it would be for them if they were left without money or clothes. That, and the threat that the Chinese would certainly imprison them, did the business, and next morning they all came and said they would go. The amban's wife came to see Mrs. Littledale; we made things very pleasant, loading her and her boy with presents, and she announced that the amban would give a guide. On paying off the Chinaman who had brought us to Saitu, I saw there was something wrong. As a matter of policy, I had paid him five times what he was entitled to, so I did not think he could possibly be dissatisfied. On being questioned, he explained that it was the custom, when a big man gave a present, for the receiver to knock his forehead on the ground; but were he to do so, all the people would see and know that he had received something, the amban would hear it, he would lose his money and get into trouble, so he hoped I would forgive him. To be more independent, I was obliged to purchase outright the donkeys I had hitherto been hiring, and to keep their late owners on wages like the other men.

In a humble way we are able to confirm the accuracy of Marco Polo. He mentioned that it was a month's journey from Lob to Saitu. Colonel Yule, in a note, questions the correctness of the time. It took us exactly thirty days to travel the distance. He further said the inhabitants flee into the desert from invading armies, and the wind quickly blows the sand over their tracks. One day I stayed behind to help a donkey out of a swamp, and, although our big caravan was not half an hour ahead, every trace of their track had been obliterated by the wind. But I am afraid somebody must have been imposing on the great traveller when they told him that spirits inhabit the desert, who call travellers by their names, and lure them away to destruction. I regret that we really cannot help him out with that statement, though the wind on the

sand certainly does make peculiar sounds. We left Saitu on July 6, without regret; the heat had been great—104° to 106° in the tent. After a few miles we left the oasis, and, crossing a strip of desert, we reached another valley, where there was water and grazing. In the north side of this valley, which was composed of a gravelly rock, there were excavated an immense number of Buddhist caves; they extended for nearly half a mile, and there were three or four tiers of them, very similar to Mingui. There were two large Buddhist figures; the foot of one of them, minus his toes, was sixteen feet long. I measured them with a clinometer, and made them to be upwards of 80 feet high.

FIG. 3.—TONGUT GUIDES.

They were cut out of the rock, and where it was faulty the flaws had been filled up with clay. Each figure had a cave to itself, with openings cut high up in the rock, so that light was admitted. Over the head of the taller one, which reached to the top of the rock, there were the ruins of a building like a temple, apparently built to protect the figure from the weather.

Our next march was to the edge of the same gravelly plain that we had crossed about seventy miles further west, when leaving the mountains. Next day we made a long march, and had to camp on the plain without grass or water. Had we, instead of going to Saitu, followed along the base of the mountains, we should have shortened our

march ten days, and saved our animals a lot of wear and tear. A wolf killed a sheep in broad daylight within 50 yards of our camp, and chased another for several minutes, though everybody was shouting and trying to drive it away. I fired three or four fruitless shots at it with a repeating-rifle, but, as they doubled backwards and forwards amongst the boulders, I was afraid of hitting the sheep. We crossed a pass which we thought might be over the Humboldt range, but it proved to be only a spur, which I think it would have been better to have gone round, as we had to climb up and down 3000 feet. From the summit we had a good view of the snow-covered Humboldt range facing

FIG. 4.—YAKS CARRYING WOOL FROM THE KOKO NOR TO HSI-NING.

us. I saw no glacier at this end, but further along almost every valley had a small one. Our guide, a Chinaman, had brought his son, a child of five or six. He was away all night looking for his horse. Our men asked the boy to come and sleep near them; he declined because he had his father's things to look after; so he slept alone, a hundred yards away from the camp. Imagine an English child of that age doing the same! The father afterwards sold the boy to some Kalmuks.

We marched up a valley five to ten miles wide, with the fine snowy Humboldt range on our right; as we went east the mountains got higher. We passed several places where there had been gold-mining; some of the shafts were a good depth, but all were abandoned. We

stopped at a yurt belonging to some lamas, and were offered sour milk; Mrs. Littledale (to avoid hurting their feelings) drank it. The lama took the empty bowl from her, and then the longest, broadest, and reddest tongue I ever saw curled round inside the bowl a couple of times, and it was replaced on the shelf washed, as before. After watching this cleansing process, my wife wished she had not been so polite. Our guide only knew the road to Hsi-ning by the Tsaidam-Gobi, so we stopped a day to negociate with some Kalmuks for guides. One man looked intelligent when Buhain gol was mentioned, and said it flowed to Koko Nor; but he afterwards denied all knowledge of it. Bribes were tried in vain, and I had actually hold of his horse's rein to seize him and compel him to come, when a man appeared who was willing to go in return for a horse and some money.

To the north the country was composed of barren clay hills of no great elevation, with sandy valleys; but there was to the north-east a rather high snow range, which seemed to start from the Nan-Shan and run north-west. We had been eight days ascending this valley; we crossed a small pass which was only over a spur of the Humboldt. What I saw from the top was quite unexpected. It appeared from the distance as if the Nan-Shan were not connected with the Humboldt at all; between the two there was a broad plain with hardly a perceptible rise, with lakes which apparently formed the watershed; to the east the water would probably run into the Koko Nor, and to the west into the Gobi desert. Nearly due east we saw the Nan-Shan, magnificent snow-peaks, some of them very high; the guide said it would take three days to reach them across a barren country. A few miles after crossing the spur we turned south and crossed the Humboldt by a low easy pass, Ping Dawan being the Chinese name, Captal Dawan the Mongol; height by aneroid, 16,178 feet. On getting to the south side of the Humboldt, we found there was another much higher range of mountains, running parallel with them, as far as I could see, in a north-westerly direction; there was a good deal of snow on them. Some of the peaks were high. One in particular to the south-west, with its cone of snow and large ice-fields, was a conspicuous landmark; it remained in sight towering above its neighbours for several marches. I estimated its height to exceed 20,000 feet. The Tongut name was Amnermurgil. There was another peak a little further away that was also very high. Proceeding in a southerly direction, we crossed the chain by the Yangi Dawan; then over a barren undulating plateau strewn with granite boulders, little lower than the pass itself on which we camped.

When a horse or donkey fell sick, the treatment was to run a large packing-needle through the animal's nose. Our caravan bashi, who suffered from the elevation, forced one right through his own, probably reasoning that what was good for an ass certainly ought to suit himself.

Our next camp was in a broad valley, 14,573 feet, with a small stream which flowed west, in which direction we saw a line of distant snow-peaks coming from the north, probably a continuation of the Hartung-Sueisan. We turned east, and, crossing a low divide, commenced to descend. The mountains to the south became higher. We saw quantities of yak—there were between seventy and eighty in one herd; antelopes and kyang in thousands. We were approaching the Tongut country, and our guide wished to return. This we would not hear of. I must say, with the exception of the two Ladakhis, all our men were now in a great fright. On our camp being pitched a few miles from a Tongut encampment, one of the dreaded tribe arrived. Even the greatest cowards laughed when our foeman proved to be a small boy of fourteen. Next day I went to interview the chief.

The tents used by these people are quite different from the felt yurts of the Kirghiz and Mongols. They are made of a rather porous woollen cloth in two pieces, which are loosely laced together, leaving a slit in the roof about a foot wide from end to end, to let out the smoke. The roof being nearly flat, and the sides having a very gradual slope, they cover a great extent of ground, and, not being high, do not catch the wind. I was offered, and declined, tea flavoured with butter and salt. Our Tongut guide dipped his fingers into the rancid butter floating in his bowl of tea, and smeared it over his hands and face. The chief examined me carefully from head to foot, and, having asked my nationality, then said, "The Englishman has wonderful guns, but very bad clothes." Then the guide topic was introduced, and after the usual objections had been overcome by the transfer of some of my property to the headman, two guides were forthcoming. Our old guide declined to leave at once, saying he would go with us till nearly the end of the march; then, by lagging behind, he could slip away unnoticed. For he said, if our new guides knew he was going, they would certainly turn back and rob him. By this arrangement he would be able to pass the large encampment during the night. Our guides did not stay long. They professed to be in fear of their lives, and they departed, leaving us to find our own way. But we were now in a better grazing country, and there was water everywhere, so one of our great anxieties was over. Only those who have experienced it can realize the horror of travelling in a waterless country with treacherous guides. Scarcity of fuel was another though minor source of trouble. We always carried a sack, in which was put as we marched along the smallest piece of wood or dropping that we could find, to make our camp-fire. With the exception of the Kurgan bulak and the neighbourhood of Saitu, we saw no trees between Lob Nor and Koko Nor. The river that we had been descending turned to the south through the mountains, which were here particularly fine and bold. We ascended a valley in an easterly direction, and camped at the foot of a prominent peak, whose altitude by aneroid

and clinometer I made out to be 18,000 feet, and next day crossed the Katin La, about 15,800 feet. It was steep and stony ascending; the descent was in some places soft clay. To the north there appeared to be a rolling, stony plateau; to the south, rocky peaks, some of them vertical enough to suit the tastes of members of the Alpine Club; to the east, the valley of the Buhain gol. As we marched down, the mountains to the south sank rapidly, and about 20 miles from the Katin La there was apparently to the south only rolling grassy hills. Further on the mountains rose and became abrupt and snowy again.

We saw across the Buhain gol some Tonguts galloping about in a great state of excitement. The Mongols profess to be afraid of the Tonguts, and the Tonguts, it now appeared, dreaded the Mongols, whom they supposed us to be. We invited them across to see us. They carried a sword stuck through their belt, and a lance at least 14 feet in length, and most of them a matchlock gun as well. I gave them a practical explanation of the repeating-rifle, omiting to inform them, however, that after firing five shots it was necessary to reload, and they left under the impression that it went on shooting indefinitely. Some days after, about one hundred and twenty similar gentlemen stopped about a mile from our camp, and our Turki men said we were about to be attacked. I held a consultation with Ramazan and Rozahun, and we decided it would be best for them to go to the Tonguts and ask for a guide; it would show them that we knew they were there and were not afraid of them. Each taking a rifle, they interviewed our friends. The repeating-rifle was expounded with such marked effect that when Rozahun proposed to explain the beauties of a revolver, they begged him to put it by. Whatever their original intentions may have been, they were far too great cowards to face us when they saw we were prepared, and they rode away, looking with their long lances very wild and picturesque.

We had now rain regularly every afternoon, and the grazing was luxurious. Our horses began to gain flesh and spirits; one of them actually bucked his load off. Poor beasts! they deserved some good grass after the rough time they had had. They showed their increased strength by marching three geographical miles an hour, in place of two and a half.

A large stream had joined the Buhain gol from the north, and the river was now of considerable size. It took us some time to find a ford, and we crossed to the left bank. Seeing four mounted Tonguts about a mile to our left, I rode towards them; they began to edge away and at last commenced to gallop. Armed with a white umbrella, I started off in hot pursuit. As they fled I saw them working away at their matchlock guns, but apparently could not manage their flint and steels on horseback. My pony was so weak he was soon outpaced, and I gave up the chase.

On August 3, the sixth day after crossing the Katin La, we camped a few miles away from the Koko Nor; we had for some days been very excited to know whether we were right in our calculations as to our position in regard to the lake, and when at last we saw right ahead its blue waters dancing in the sunshine, we knew that our dead reckoning was not much wrong. The north shore of the lake was very flat and looked swampy—there were many antelopes and kyang feeding; the south shore was bounded by mountains, but not of any great altitude. Fifteen to twenty miles south-east, in the lake, I saw an island; to the north-west the horizon was rolling grassy hills; on the north-east stood the Nan-Shan with patches of snow. We marched for a couple of

FIG. 5.—BRIDGE NEAR HSI-NING.

days along the shore of the lake. The third day we pitched our tents near a large Tongut encampment; thousands of sheep and yaks were feeding on the hills. At the door of almost every tent was a spear stuck in the ground, and standing like a flagstaff; I tried to buy a spear, but nobody would sell. They were now kind enough to offer us a guide to Hsi-ning, but we respectfully declined. Next morning our five sheep were missing; thinking they had joined one of the flocks near, we started, leaving a couple of men behind to bring them on. They overtook us in the evening, and said the sheep had been stolen and were not to be found. Our two Ladakhis, who had the greatest contempt for the Tonguts, were most anxious to start back at once; they said that if our own sheep were not forthcoming, they

would take fifty sheep to replace them, and, if the headman objected, they would bring him along too. I have not the least doubt they would have done so had I allowed them to go. Among the sheep was one that we were extremely sorry to lose; he had followed the caravan all the way from Kurla; he used to sleep by the kitchen fire, and was the pet of the camp.

We reached the busy, prosperous-looking town of Hsi-ning on August 9, four days from Koko Nor. A few miles from the town we had the pleasure to meet a Mr. Obrucheff, the Russian geologist to the Potanin expedition; he had come from Suchau by a route to the south of the south Koko Nor mountains and the lake itself.

Some Tonguts had told us that an old lama lived alone on the island in Koko Nor, and that in winter numbers of people crossed the ice to see him; others had told Mr. Obrucheff there were three hundred; Prjevalsky reports eleven. So much for the dependence to be placed on information obtained in this country.

Soon after we arrived, Mr. Hunter, a Scotch missionary, visited us; he helped us in many ways.

Two marches from Hsi-ning the road to Lan-chau bifurcates. The left-hand one, a cart-road, takes ten days; and the right, a rough mule-track along the Hoang-ho, only seven: we chose the latter. In crossing a ferry, one of the horses carrying our precious burden of wild camel skins got frightened and went overboard; but the men held on to the load, and fortunately saved it going into the river with the horse. We passed a number of water-wheels, some of them 60 feet high; they lift the water from the river to irrigate the land, principally growing poppy. In this loess-covered country water has a disastrous effect on the roads. It is of no unfrequent occurrence to see a small hole in the road; on looking down, you find the ground you are standing on is a mere shell, and the cavern beneath of considerable depth.

We had made up our minds that we would if possible get a raft and float down the Hoang-ho; so directly we arrived at Lan-chau I called upon Mr. Redfern, an English missionary. He told me that rafts did go down, but no European had been, and he did not recommend Mrs. Littledale to try it. This was the very last argument that would divert my wife from our intended route; and by next day he had arranged a raft to take us to Ning-hsia. Our craven-hearted interpreter here announced that nothing would induce him to go any further, and Lan-chau was ransacked in vain for another. One of our Turki caravan men, who spoke a few words of Chinese, agreed to come; but he spoke so little, he added much to our difficulties.

For a journey like ours, when four or five months' food for man and beast has to be carried, and where the water troubles are so great, donkeys are far preferable to ponies; mules would probably have done better than either, but we could not buy any at Kurla. Out of our

twenty ponies, though twelve actually reached Lan-chau, only four or five would ever be much good again; while out of our forty-one donkeys, about thirty of the thirty-four which survived would only require a fortnight's rest and good food to put them to rights. Our horses ordinarily carried 3 maunds = 290 lbs., and were given 4 lbs. of grain a day; and we had a man to look after each four horses; the donkeys carried 2 maunds and had 2 lbs. of grain, and one man easily managed ten or twelve. Horses walked about half a mile an hour quicker, forded streams better, and were pleasanter to ride, but there their advantages ended. We handed over our horses and donkeys to our men, as they had on the whole done well, the Kulja man for having stood

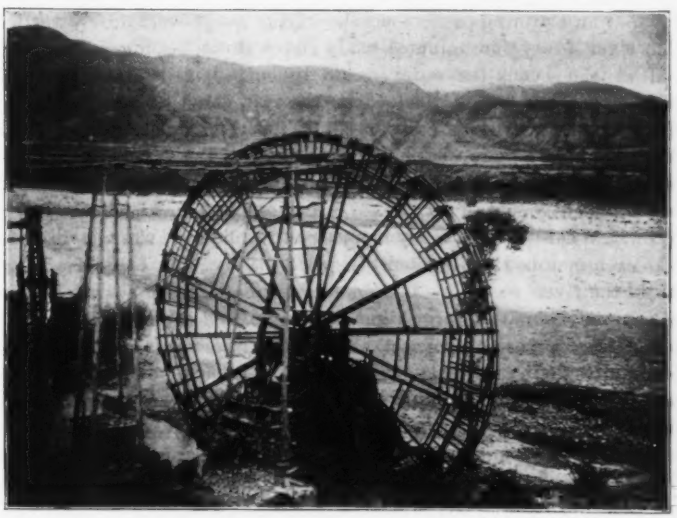


FIG. 6.—WATER WHEEL ON THE HOANG-HO.

by us in the Saitu revolt taking the lion's share, and they started back to Kurla immediately by the high-road.

Our raft was about 50 feet by 18; it had three sweeps at each end, with which the crew of twelve men were able to give it a slow crab-like motion. We pitched our tent, and with a floor of planks made ourselves comfortable. One of the raft-men had bought some baskets of peaches as a speculation; they were rather in our way, but we took toll, and it gave the headman a stake in the safety of the raft, so he was more likely to be careful.

On the Han river there is an organized system of wrecking. A gang of men will tow a boat halfway up a rapid, then the head of the gang says unless he gets so much extra the men won't pull any more; if the

owner refuses, they let go the tow-rope and the boat is smashed on the rocks, and then the rascals save as much of the cargo as they can, for as salvers they are legally entitled to half.

The missionaries came to see us off. It is impossible to speak otherwise than in the highest praise of the zeal and devotion of these men, who are spending their lives in an endeavour to Christianize the almost hopeless heathen Chinaman.

The rapid current whisked us off, and Lan-chau was quickly lost sight of. We floated nearly all day through a gorge, and went down a small rapid—we had heard there was one—and prematurely congratulating ourselves that it was past, we tied up for the night. We started at daylight, and soon the gorge became narrow, the raft dashing down at an alarming pace; the sides of the gorge were nearly vertical. The river every few minutes made sharp turns, boiling and surging, and at the bends the water would be heaped up against the rocks, higher than my head as I stood on the raft, and then flow away in a succession of whirlpools. I thought if the river was going to be like this all the way there was not much chance of the raft keeping intact, for we had bumped once heavily, fortunately not in the most rapid part, but sufficiently so to break some of the logs and to knock the raft all askew. What did not exactly increase our confidence, was the discovery that each man had an inflated sheepskin handy. At one place I don't think the river was more than twenty yards wide. Fortunately, after a couple of hours the gorge came to an end, and the river widened out and went at a more sober pace. Here half our crew put all their worldly goods into their skin bags, which they re-inflated, and then paddled themselves ashore. They had, it turned out, only been engaged for the dangerous part. In spite of all their efforts, the raft had on several occasions spun round in a decidedly awkward manner. In the gorge there were, of course, no habitations, but below there were scattered villages.

The ferry-boat of the country was made like a sheep-hurdle, under which were fastened about nine inflated skins; the ferryman paddled it like a coracle, and the passengers sat behind. As we got lower the river separated into several channels, and then our troubles began. Owing to the unwieldiness of the raft, we were not always able to take the most promising channel, and we constantly stuck fast. The raftmen used to tie six or eight of their longest and biggest logs together, making a thick boom nearly as long as the raft; one end was tied close to the raft, the other had a very strong rope, which kept the boom at right angles. In the strongest current there was a great strain, and off the raft used generally to come; but sometimes the water was so shallow that we had to pull the whole raft to pieces, and float it down log by log over the obstruction, and rebuild it below. We passed some flat-bottomed boats; the owners were very anxious to take us down to

Bautu. We declined, as we thought we should get a better choice of boats lower down; but it was a great mistake, and anybody descending the river ought to engage the first available boat after passing down the gorge; no boats ever come through the gorge, for even if they got safely down they could never return. The river, as we descended, flowed through so many channels that none were very deep, and the raft exhausted our patience, for no sooner had we rebuilt it at the foot of some shallow and started, than it would stick fast again, and there was every prospect of our taking a month to reach Ning-hsia. Our raft-men had all one morning been taking logs off our raft and making a smaller, they said, to tow us off. They then put their peaches on to the smaller one "to lighten the big one," immediately cutting the rope; and away they went, leaving us on the remains of the raft with only three men. Fortunately, I soon after arranged with the owner of a scow piled up with wool that happened to pass, that they should take us and our baggage to Ning-hsia. It was a fortunate thing for the absconding men that our boat never overtook the little raft, for assuredly, had we done so, their fruit should have gone into the river. From our elevated position on the top of the wool we had a capital view of the country, and we constantly saw the Great Wall of China, twisting and turning like a great snake. It was not usually a very magnificent affair, being built of stones where they were plentiful, otherwise of sun-dried brick and mud. We arrived on August 28 at Ning-hsia, or rather at the landing-place, for the town itself was several miles away from the river. The only boats available were a couple of scows laden with grain. They agreed to take us and our baggage to Bautu in nine days for twenty-two taels; after we had paid our money, some Chinamen came on board and said the boat could not start till the boatmen paid them some money. I suspected a swindle, so told them the boat would start in ten minutes; if they could not arrange in that time I would give them a passage to Bautu, and they could see the mandarin there. They became very abusive, so they were summarily ejected; then four or five of them held on to the painter, and I had the greatest difficulty in restraining our two Ladakhis, who were eager for a fight, from using unnecessarily strong measures. We had not gone far when both our boats grounded, and remained fast several hours. A boat-load of soldiers arrived with our old antagonists; they did not come to our boat, but we saw a violent altercation going on in the other. The boatmen finally told them that if they did not go they would fling them into the water, soldiers and all. It was impossible to pitch the tent on board, it caught the wind too much, but I arranged a small awning, and we used to camp on shore at night. There were very few inhabitants along the river-side; here and there a village, but the greater part of the way the desert comes pretty close to the river, and the hills from a distance look very barren. The river when we first saw it was a deep

red colour, but it now assumed a dirty grey look; it was generally about a quarter of a mile wide, rather shallow, and the banks covered with bushes and willows, and beyond nothing but drifting yellow sand. One of our boatmen complained of his eyes, so we gave him a couple of pills.

A Chinaman was overheard asking another why we gave two pills; the reply was, "He has two eyes; do you think he only wants one cured?"

Between Ning-hsia and Bautu there is a considerable traffic. Scows loaded with wool or grain drift down to Bautu; they are then towed by their crew of five men upstream again, taking two to three months on the round trip. As we approached the place where the Hoang-ho commences to bend to the east, we saw more frequently sheep and cattle, especially on the left bank. On nearing Bautu, the mountains which had been distant on the west and north now ran close to the river, and there was a small lamaserai on each side of the river.

We arrived on September 12 at the small walled Chinese town of Bautu, having taken twenty-five days to drift down from Lan-chau. We hired five carts to take us to Kwei-hwa-cheng for 35,000 cash. The price was not as ruinous as the high figures would imply, the equivalent of a seer or tael (1 tael = about 4*s*.) being about 1400 cash. The carts were like dog-kennels on wheels, being about 2½ feet wide, 3½ long, and 3½ high, drawn by a pair of mules harnessed tandem; the driver sits in front with his legs dangling over the shaft, as near the centre of the cart as the good nature of the passenger allows.

We passed through a country abounding in ruined towns and villages, not one-fifth of the houses in some of them being inhabited. The ground was frequently terraced right to the summit of the hills, but only the most fertile plots are now cultivated. Such is the result of the disastrous Mohammedan rebellion of 1861, which caused the destruction of nine-tenths of the population, and from which the country, after a lapse of so many years, is only just beginning to recover.

By promising rewards we reached Kwei-hwa-cheng on the third day. We were most hospitably received by Dr. Stewart, a medical missionary. In describing the difficulties of the Chinese language to beginners, he told me, among other things, that the words for chicken and wife closely resembled each other. Once when prescribing for a sick Chinaman he found he had told him to cut his wife's throat and make broth of her. Another missionary ordered his servant to go to the bazaar and buy a chicken; the man was gone nearly all day, and returned saying that good-looking women were awfully scarce just then, and he would have to pay thirty taels for a young one.

In this town there were a colony of Swedish girls living alone; they had been sent out to China through the instrumentality of an American. These poor ladies had been exposed to many insults on their way up country, and to daily ribald remarks in the streets at Kwei-hwa-cheng,

and one shudders to think what may be their fate. It is difficult to speak temperately of a society or individual that, in the name of religion, lightly takes the responsibility of sending these women out wholesale to a country like China, and when there, leaves them practically without supervision or protection and with most inadequate means. It will scarcely be credited that, though they usually go about in pairs, a girl hardly speaking a word of the language will sometimes be sent alone with a Chinaman several days' journey in a cart to visit some town where there is no European. Altogether, I don't think Mrs. Littledale or I have ever felt more sad than the day we left those kind, enthusiastic, open-hearted Swedes.

We travelled by day in our carts over a thinly inhabited and sparsely cultivated country, pitching our tent at night if there did not happen to be a clean inn. After going four days, we had to change the axle-trees of our carts, the roads from here to Peking being in many places too narrow for the broad-gauge carts in use further west; and besides, the ruts were so deep it would have been impossible to travel unless the wheels fitted them. The inhabitants of the country became more numerous, and, as "foreign devils" were no novelty, we suffered no annoyance, except ludicrously extravagant bills used to be presented for our night's accommodation.

On September 27 we passed through the Great Wall by a rather mean gateway. The wall looked very picturesque, winding up and down the hillsides in apparently rather an aimless manner, and sending out a branch wall here and there without any apparent reason; it was made of mud, and faced with either brick or stone, and had a crenulated parapet. Although there was only room on the top for two carts to drive abreast, in place of the six I read about in the days of my youth, it was on the whole rather imposing. Down the Nankau pass and over atrocious roads we jolted for three days. Shortly before reaching Pekin we passed three large antiquated-looking castles; they were built after the model of Tibetan strongholds by the Emperor Chien Lung, when meditating a campaign against Tibet, so that his soldiers might see the kind of fortresses they would have to attack, and practice scaling the walls. Another tradition has it that they were erected by the emperor to commemorate a successful (?) Tibetan campaign. One of our carts sank to its axletrees in indescribable filth, and stuck fast for a couple of hours. The whole traffic of Pekin by that gateway was stopped in consequence; there were at least a hundred carts delayed, and yet not one of their men would help our cart, and so clear a way for themselves.

Our arrival at a comfortable little hotel in Pekin may be considered the end of our journey; the rest was plain sailing. We paid our plucky Turki interpreter in rouble notes, which he sewed into the lining of his coat; and he started alone on his long journey of four months back to Kurla. Ramazan and Rozahun accompanied us to

Hong-Kong, where we saw them on board a direct steamer to Calcutta, from which place they would return through Kashmir to Ladakh.

Should we ever wander into inner Asia again, the day we secure the services of those two good little fellows the difficulties in front of us will be already half overcome.

Before the reading of the paper, the PRESIDENT said: We have the pleasure this evening to welcome back to England Mr. Littledale, whose interesting paper after crossing the Pamir tablelands will be remembered with pleasure by most of us, for it was actually read very little more than a year ago.

After the reading of the paper, the following discussion took place:—

The PRESIDENT: Mr. Littledale's interesting paper suggests many topics of reflection and discussion and inquiry, but the central point of all is, perhaps, the wild camel. I hope Sir William Flower will kindly give the meeting some opinion respecting the animal he has seen from the collection of Mr. Littledale.

Sir WILLIAM H. FLOWER: I am in the habit of dividing travellers who go into remote regions of the world into three classes—those who slay the animals of the countries they pass through and leave them where they were killed; those who bring home their trophies and carry them off to distant and perhaps inaccessible parts of the country where they may happen to reside, to hang them up in their halls, where in process of time moth, dust, and decay destroy them; and those who recollect that there is in London, in the Cromwell Road, an institution where such trophies as are of scientific interest will be preserved for the benefit of all who are capable of deriving any advantage from them. I am happy to say Mr. Littledale is one of the third class, and that zoological science has very much benefited, not only by his last adventurous journey, but other equally remarkable and adventurous journeys which he, accompanied by his brave and heroic wife, has undertaken. One of his earlier expeditions enabled the museum to exhibit, for the first time in Europe, specimens of the largest and finest of all the sheep tribe—that which was seen years ago by Marco Polo, and which, when rediscovered recently, was named after him the *Ovis poli*. A beautiful group of these animals is now mounted in the mammalia gallery of the Natural History Museum. From another expedition he brought home from the almost inaccessible mountains of the Caucasus specimens of that interesting animal, the bison, which in former times ranged over the whole of Europe and our own islands, allied in many aspects to the bison of North America. It has become extinct in the old world except in two regions—a forest in Lithuania, where a small herd has been preserved by the Emperors of Russia, from which one specimen was sent many years ago by the Emperor Nicholas to the Zoological Gardens, and is now stuffed in the Natural History Museum; the second locality is this region of the Caucasus, where Mr. Littledale shot a bull and a cow, now exhibited in the museum. On this last expedition, of which we have just heard such an interesting account, beside some smaller though hardly less interesting animals, he succeeded in bringing home the wild camel. As we all know, there are two forms of the domestic camel—the one with two humps, found in Central Asia, Persia, and the south of Russia; and the one-humped species, or dromedary, found in India, Arabia, and throughout a considerable part of Africa. Wild camels, until recent times, had been quite unknown, and the origin of the domestic camel was, as is the origin of many of our domestic animals, involved in mystery. The history of the camel, as has been revealed by recent geological explorations, is a very curious one. Though now living in Africa and Asia, we have not at present found any fossil remains of camels in early formations in the old world, but most

unexpectedly, during a survey that began about twenty-five years ago, remarkable fossiliferous deposits were found in pliocene, miocene, and even going back to eocene times in the western part of North America, and there was discovered the original home of the camel, and the American palæontologists have traced it from a primitive generalized form of the group to which the existing camel belongs by a succession of minute changes; but, curiously enough, it became entirely extinct in the region where it seems to have been originally developed. Some, however, emigrated to South America, remaining there in the form of the lama, vicuna, and alpaca found in the Andes of South America and Patagonia; and the other branch appears to have crossed that bridge of land which once extended across the North Pacific, and spread over the regions of the old world indicated just now. Unfortunately, it is impossible to say whether these camels which run wild without owners in the western parts of the great desert of Gobi, discovered by the celebrated Russian traveller, Prjevalsky, and afterwards by Mr. Littledale, are really wild, that is, descended from camels which have never at any time been domesticated. About a year and a half ago a skin was exhibited at the Zoological Society by Mr. Blanford, brought home by Major Cumberland, which was the first evidence of the wild camel brought to this country; but Mr. Littledale is the first to bring home complete specimens, not only skins, but also skeletons, which give the full characteristics of the animal, and which will soon be ready for exhibition in the Natural History Museum. It belongs to the two-humped species, as may be supposed, as the tame camels of Central Asia are two-humped; but the humps are poorly developed—in fact, in the specimens at the museum, scarcely developed at all. In all probability the primitive camels had no humps, as the lamas of the present day have no humps, and the great humps developed in our domestic camels are the result of domestication, cultivation, and selection, and also depending for their size upon the condition of the animal, developed by good feeding. These wild camels were certainly in very poor condition, and, being also just changing their coats, have a rather shabby appearance compared with some of the domestic animals we may have seen in their fine winter coats; nevertheless, they are most interesting animals, and we are all very much indebted to Mr. Littledale's energy, endurance, and courage in going so far in search of them and bringing them safely back to our national museum. I think the other specimens Mr. Littledale brought home I had better leave Dr. Günther to mention, as he has most carefully examined them all, and probably will tell us something interesting about them.

Dr. GÜNTHER: I can hardly add anything to Sir Wm. Flower's remarks. The other animals which Mr. Littledale has collected consist of species which are of great interest to zoologists, but which do not demand the same attention that so remarkable an animal as the wild camel does. I followed the course of Mr. Littledale's expedition with some anxiety, he having mentioned at the outset that he meant to come home through China, and I therefore thought there was but little prospect of seeing specimens of the wild camel. The wild camel was discovered by Prjevalsky some fifteen years ago; he succeeded in bringing five specimens to the St. Petersburg Museum, and I humbly hoped that a specimen of so interesting an animal might be obtained for the British collection, but the authorities of the Russian museum seemed to be anxious to keep them all. The animals Mr. Littledale brought home are in very good condition, particularly the skeleton. There is not the least reason to doubt that the camels, whether tame originally or not, have multiplied in a wild state, and are now perfectly adapted to life in wild nature. It is singular that within a recent period we have become acquainted with a similar instance; I allude to the dromedaries in the south of Spain. It is reported that some years ago dromedaries that had been used as beasts of burden were turned adrift

and had multiplied; and I heard only yesterday that the Comte de Paris, who takes special care of them, has now a herd of forty or fifty individuals of this one-humped camel in a perfectly wild state, existing without the assistance of man. There is only one other remark I have to make. Mr. Littledale has now obtained so many spoils that there is only one other left for him to gather, and I hope Mr. and Mrs. Littledale will have retained energy and health enough to accomplish this feat too, and, that is, to obtain specimens of the wild horse which is still roaming over the plains of Central Asia.

General Walker: It is so late that I will only point out that the hand-map prepared for general use this evening is divided into two parts: the lower contains the journey of Mr. Littledale from Batum to China, but the upper part contains what is really of very great geographical value, the journey from Lob Nor to Saitu, and from Saitu to Koko Nor. The lines over which he has travelled in this portion of his adventurous journey are perfectly new; no European ever travelled over them before, at least, since the time of Marco Polo. I think it very remarkable that a journey of this nature should have been accomplished by a gentleman travelling with his wife; it is the most remarkable feat for a lady to have accomplished that I ever heard of. Mr. Littledale has given an exceedingly modest account of it all, but really, when one comes to think it over, it is all the more astonishing that any lady should have performed a journey over such a difficult and dangerous line of country. Saitu is a point reached by a number of Europeans: Prjevalsky coming from the north; Messrs. Carey and Dalgleish from India; the Indian explorer A-K (Krishna), who gained great credit for his adventurous explorations in Tibet; and Count Széchenyi, the Austrian traveller, coming from China. Mr. Littledale has travelled from Lob Nor to Saitu as no European has done before since the time of Marco Polo, and then from Saitu to Koko Nor, which, I believe, is wholly new ground. I think he deserves every honour that the Society can pay him, and I only regret that Mrs. Littledale is not here this evening in order to receive the recognition which, I am sure, she would receive from every one here present.

Mr. Delmar Morgan said that, besides the zoological facts brought to our notice by Mr. Littledale, he had done much to elucidate the geography of an almost unexplored region. His route lay along the northern foot of the Kuen Luen, a system of mountains the very existence of which was unknown before Alexander von Humboldt's time. It was at the suggestion of this learned geographer that the British Government sent the Brothers Schlagintweit in 1856 to explore its western extremity, and the late Sir R. Murchison had said of these travellers that they were "the only geographers to visit these localities and sustain what Humboldt had affirmed, that his Kuen Luen presents all the characters, relations, and attributes of an independent chain." More recently Baron von Richthofen had ascertained the continuity of the system through upwards of forty degrees of longitude into China. The late Gen. Prjevalsky had visited central parts of the Kuen Luen, but it was reserved for Mr. Littledale to fill in a gap left by that eminent traveller between Lob Nor and Sha-chau. This was the route along which passed the Chinese silk trade, and Marco Polo had been the last European traveller to describe it. Within historical times the region in question had been very different to its present condition. Three hundred and sixty of its flourishing cities are said to have been buried beneath the drift sand. Mr. Littledale mentioned a range of mountains to the north-east of Sha-chau. M. Potanin, in crossing this part of the Gobi, also met with chains of mountains in about the same parallel, and saw some snowy peaks. He called these ranges "Gobi Altai," taking them to be south-easterly ramifications of the Altai system, which apparently extends to the borders of China.

"Gobi," according to this Russian traveller, is not a desert in the sense that the Sahara is a desert; and the word "Gobi" is applied locally to raised plains, not arid tracts. There were other points suggested by Mr. Littledale's interesting paper, but at that late hour of the evening it would be impossible to discuss them.

The PRESIDENT: There are several interesting points on which it is too late to dwell with reference to the paper of Mr. Littledale. I think, however, that there is just time for me to express regret that he should cast a doubt upon the statements of Marco Polo, that spirits whisper the names of travellers as they pass through the deserts, and hear other travellers passing by them who are invisible. At all events, it is a well-known fact that in many deserts drums and fifes are heard, and tattoos are beaten in the early morning. Mr. Littledale acknowledges that he has heard sounds like drums. Lieut. Wood went out of his way to hear this music, and Sir F. Goldsmid has experienced it also. I have heard similar sounds in the deserts of Peru, such as may have appeared to Marco Polo to be the whispering of his own name. If I remember rightly, Sir Henry Yule collected a good many instances of such sounds being heard in the deserts of Asia, which are extremely interesting. We have not had time to discuss the loess caves where the statues have been carved, and the figures on the roofs, which, I have no doubt, merit very careful investigation. One other thing I should like to refer to of not so pleasant a character, and that is the reckless way in which missionaries seem to have sent a number of respectable young women into the centre of China, and to have left them alone with very meagre resources. It is, I think, a most disgraceful story, and I trust Mr. Littledale will take care to have it brought strongly before the notice of the Swedish Government. I think you will be glad to hear that the fox-terrier arrived safely in England again, but very thirsty, because it drank nothing from Pekin to London. We all regret that through illness Mrs. Littledale has been unable to be present with us this evening, but I am sure you will unite with me in offering our most hearty and cordial congratulations to Mr. and Mrs. Littledale on having accomplished this wonderful journey, and in returning our very grateful thanks for so interesting a paper.

MR. LITTLEDALE'S MAP FROM LOB NOR TO KOKO NOR.—The starting-point on this map is Abdal, to which the same position is given as that assigned to it on the Society's map of Tibet. It has been constructed from a compass route survey by Mr. Littledale, checked by astronomical observations. The distances travelled were most carefully estimated by pacing at intervals for a fixed distance beside the caravan and observing the time occupied, by which the speed at which the caravan was travelling was arrived at. Mr. Littledale carried a watch which kept a steady rate throughout his journey, and he was thus able to fix his longitude by frequent observations with a sextant of the sun and stars for time. Observations of *Polaris* were taken for latitude every evening when the day's march was over, and the work was plotted and inked in on the map every night. A large number of aneroid readings were taken for the determination of heights, as well as compass bearings to all prominent objects within sight of the route followed.

MAP OF THE HOANG-HO.—The starting-point on this map was Lan-chau, the position of which is that assigned to it by Prjevalsky and Rockhill. Compass bearings were taken of the course of the river, and prominent objects in sight from the aft on which they journeyed down the river. Every evening sextant observations of Polaris were taken on the river-bank for latitude, and numerous aneroid readings were recorded.

THE RIVER NAPO.

By CHARLES DOLBY TYLER.

But little has been heard of the river Napo since the year 1551, when Orellana descended this now historic stream; and no steps have been taken towards colonizing the fruitful country through which it flows, if we except the policy of a former dictator of Ecuador, who banished his political enemies thither, in the hope that they would, sooner or later, fall victims to savage or beast.

It was, perhaps, the air of grim mystery which enveloped it that induced me, when at Iquitos, near its mouth, to undertake a journey up this river, and it is the result of my observations during that trip, combined with the experience acquired from a three years' residence in the Amazonian region, which I propose to deal with in the present paper.

The journey from Iquitos to the delta of the Napo, and thence to the Curaray, a tributary on its right bank, was made in fourteen days in a steam-launch drawing four feet of water. From the Curaray to the village of Napo, a distance of about 340 miles, I travelled in a canoe: time occupied, forty-two days. Thence to Quito proved a toilsome journey afoot, through trackless forests and over high mountain ranges, that lasted ten days. Altogether I spent nearly three months in getting from Iquitos to Quito, distributed as already stated, with the exception of a few days spent at rubber stations *en route*, and a fortnight at the Jesuit Mission at Archidona, on the termination of my canoe voyage, owing to the absence of catechized Indians to carry my *impedimenta* forward.

For all practical purposes, and to facilitate a description of this river, it may be divided at the junction of the river Coca, and treated as two distinct streams, the Upper and the Lower Napo. The line of demarcation at Coca is so apparent as not to escape the notice of even the most superficial observer. The bed of the river here ceases to be of sand, and above Coca it is entirely rocky; the river, that up to this point has a fall of about 0·873 foot per mile, suddenly acquires a stronger current in a fall of 7·4 feet. The low flat country is here left behind, and with it the luxuriant vegetation characteristic of the Amazon basin. Slight elevations occur that gradually increase in height as one approaches the eastern spurs of the Cordillera; and the temperature falls several degrees in as many miles after entering the upper stream.

The *embouchure* of the Napo is divided into three channels, the central one being the largest and most navigable. It is 1100 yards wide, and has an average depth of three fathoms. The first, or eastern outlet, is extremely narrow, and too shallow to admit of any craft larger than a canoe. The third channel is about 300 yards across, but is also

shallow, and its greatest depth never exceeds a fathom and a half. The whole of the delta is low, but this is more noticeable about the third outlet, where the wide low-lying banks present the appearance of marsh-land. The island of Destacamento, formed by the main and western channels, abounds in pebbles, and it is said that gold has been obtained from it, but I was unable to establish the authenticity of this statement. The fact that polished quartz pebbles are found thereon, as also in the bed of a streamlet at the rear of Iquitos, is remarkable, as in all the country round, within a radius of fifty or more miles, not a stone of any description is obtainable.

During the whole of its course, the Lower Napo is an extremely sluggish river, whereas the upper stream is remarkably swift. The following altitudes taken by me, the approximate distances from one point to another, together with the width of the river, will fully explain this:—

Altitude at mouth of the Napo	391′	above sea-level.
„ „ „ of the Curaray	507′	„
„ „ „ of the Coca	784′	„
„ „ the village of Napo	1450′	„
Distance from mouth of the Napo to the junction of the Curaray	200	miles.
„ „ „ of the Curaray to the junction of the Coca	250	„
„ „ „ of the Coca to the village of Napo ...	90	„
Width of main channel at the mouth of the Napo	1100	yards.
„ opposite the Curaray	800	„
„ „ the Coca	450	„
„ „ the village of Napo	40	„

The whole of the course of the Lower Napo is navigable for steamers drawing but little water. As yet, no steamer or launch has essayed to pass above the Curaray, and ordinary propelling vessels could not go up much further except at the imminent risk of being laid high and dry by a sudden fall in the river.

The depth of the channel is very variable, owing to the alternate rise and fall of the river and the shifting nature of its sandy bottom. An average of two fathoms may be taken between the mouth of the Napo and the Curaray, and from a half to one fathom on approaching the Coca. The only class of steamer that could navigate this river successfully would be a flat-bottomed stern-wheeler, provided with log-guards, and drawing not over thirty inches when laden. The supply of fuel is practically inexhaustible, the entire length of the Lower Napo being studded with groves of *Capirona* or Mulatto wood, *Palo Remo*, and other resinous trees that are suitable even in a green state for fuel. At Puca Urcu, some 250 miles from the mouth, there exists a deposit of bituminous substance, not unlike coal, which could be utilized for generating steam.

The average temperature on the Lower Napo is 82° Fahr., and the variation throughout the year is very slight, except during the equinoxes,

when the thermometer not infrequently registers 64°. On the Upper Napo, however, a marked variation is noticeable—the mean temperature during the dry season, from June to November, being 75° Fahr., and in the wet or wintry season, 78°. At Archidona the average descends to 72° in summer. During the whole of my three years' residence on the Amazon the thermometer rarely went above 90°, and never five degrees beyond, whereas during the dry season it stood frequently at 76°.

Owing to the numerous lagoons that line the course of the river, and to the swampy nature of its banks, malarial fever, rheumatism, and dysentery are prevalent; but experience tends to show that when a clearing is made in the forest, the use of light flannel underwear adopted, and a regular and frugal diet observed, these dangers may be minimized. The natives are subject to two kinds of cutaneous disease, which appear to be constitutional. One is a bluish discoloration of the skin, and the other a white blotch where the *cutis* has, apparently, lost its pigment. Where the origin of these diseases lies it is difficult to discover, but the simple Indian will assure you that the former comes from eating tapir, and the latter from an undue consumption of white cayman.

As a field for colonization, the Napo valley, from the junction of the Curaray to the village of Napo, leaves little to be desired; but the Upper Napo, for obvious reasons, would be preferable for an Anglo-Saxon immigration. Meanwhile, and until a good road were made to connect Napo or Archidona with Quito, communication could be adopted with the main Amazon by means of the steam-launch already described, and there is no doubt that a scheme for colonizing this region, if carried into effect, would prove successful. Individual efforts, however, cannot be too strongly condemned; the influx of colonists should be wholesale. Native labour cannot be relied upon. The *yumbos*, or semi-civilized Indians, which are met with on the upper part of the river, are a lazy, treacherous set, and do next to nothing beyond providing their *curés* with the needful means of subsistence; while the savages on the Lower Napo are quite untractable, and have, moreover, acquired such a wholesome horror of the Viracucho, or white man, and his rifle, that they flee at the sight of him.

The various tribes of Indians that inhabit the Napo region differ but slightly from one another in their manners, customs, and belief, and in describing the Zaparo tribe at length, I shall have given a fair illustration of the generality of them.

The Zaparo tribe, which inhabits the country that lies to east and west of the rivers Pastassa and Napo, and from about 0° 40′ S. Lat. on the north, to 2° 20′ S. Lat., close to the Curaray, on the south (an area of about 12,000 square miles), is made up of numerous subdivisions or families, among the principal of which are the Ahuishiris, Andoas, Curarayes, Matagenes, Mautas, Meguanes, Nuganus, Nushinus, Rotunus, Shiripunos, Sinchictus, Supinus, Tiputinis, and Yasunis. Though an

integrate body when threatened from without, they live in a state of continual feud among themselves.

They lead a semi-nomad life, and are not always to be found at their settlements, as they follow in the wake of the animals they chase when these migrate eastward or westward in search of ripening fruit. They cannot be said to live in villages, for the temporary beautiful rustic sheds they erect, which are open on all sides, and contain no other furniture than a couple of palm-fibre hammocks slung crosswise within, serve them only a few months at furthest, until game becomes scarce, when they strike camp and press forward. The Curarayes, Yasunis, and Tiputinis are, however, exceptions to the general rule, for they seldom quit their villages, and lead an agricultural life. Beyond hammock-plaiting and the weaving of fishing-nets, the Zaparo knows of no industry whatever.

In general appearance these Indians somewhat resemble the Chinese. They are below medium height, fairly well developed, and very hardy. As in the Chinese, there is the rounded face, small obliquely set eyes, and prominent cheekbones; the nose and lips are rather thick, the former being slightly flattened. They are beardless, and usually wear a shock of unkempt hair, which is somewhat finer in the gentler sex. The women have, on the whole, a very pleasant cast of countenance, and are beautifully formed. They enjoy a great amount of freedom, which is only just, seeing that they do all the work—hunting excepted, which alone is the duty of the men.

The only covering worn by both male and female alike is a long shirt of bark fibre in a single piece, called a *llanchama*. To obtain this, they fell a moderate-sized tree, and baste it with clubs until the outer bark is broken off, and the interior fibrous envelope becomes detached from the wood. This inner bark, when removed, is partially closed at one end, two armholes are cut in at the sides, and it is then sun-dried preparatory to being ornamented with fret and circle designs in red, without which it would not be considered serviceable.

Their weapons are the *macana*, or two-edged sword, and the spear, which they manage dexterously. I had the pleasure of witnessing a spear-play between two parties, consisting of about a score of warriors on either side. They aimed deliberately at one another in rapid succession, and caught the flying weapons of their adversaries as they approached. Sometimes one brave, more expert than the rest, would catch three or four, and, whilst hurling them back again, catch another. In spearing fish they are remarkably expert, seldom failing to transfix the finny prey at a first cast. The *macana* is made either of *chonta* (palm wood) or *huacapu* (*lignum vitæ*), and is a most unwieldy weapon. It is usually about five inches broad at the point, and tapers down towards the handle; it varies in length from thirty inches to three feet. The blade is also painted with a red design in fret, as are the gourds,

and in some instances the savages themselves, especially when on the war-path. There is a smaller reproduction of this weapon, measuring from eighteen to twenty-four inches in length, termed facetiously the *Itumu-aishna*, or wife-corrector, which, as its name implies, is destined to quell domestic broils.

The men are very shy and silent before strangers, but, curious to say, the women—many of whom are really beautiful, and well calculated to excite the jealousy of their companions—are quite the reverse; jealousy is a dead letter to the Zaparo. In their connubial relations they are exceedingly irregular, and in the course of a season the head of a family will change, discard, rob, or buy twenty different spouses, many of the old ones coming back to him in the course of time. Each male is allowed to keep by him as many wives as he can conveniently maintain by the chase.

Each clan or division of the tribe is ruled by a chief, who is generally respected, and on occasion obeyed. He is never selected by the community, but falls naturally into place through a continually asserted superiority coupled with feats of daring. Besides the chief, there is yet another authority whose influence is illimitable: this is the *shimanu*, or medicine-man—the oracle of the clan, whose word is never disputed, even by the chief himself. He it is who averts the evil influence of sorcery and witchcraft; and yet, when so required, can exercise either with impunity. He alone has safe access to the *Munyiu*, or evil spirit, and, clad in tapir-hide, impersonates this demon when vengeance is exacted; only through his intercession can the wrath of *Munyiu* be averted. It is the medicine-man who habitually drinks the divining *ayahuasca*, and, like the Pythoness of old, in his delirious trance converses with both good and evil spirits, unravels the mysterious future, reads the destiny of his tribe, and receives the commands of the Spirit of Life. Many of the adults also partake of *ayahuasca*, this practice in some instances degenerating into a vice. The beverage is a decoction of a certain species of liana, and is equally as narcotic, though less baneful in effect, as opium. When under its influence, the savage becomes simply unmanageable. He first commences to talk of birds and flowers, and every gay-coloured and beautiful thing imaginable, and, in this primary stage, is exceedingly amorous. Soon, however, this gives way to fearful delirium, when the patient becomes dangerous, and, unless forcibly restrained, would run amuck of every living being that crosses his path. This attack is followed by complete prostration, which ends in deep sleep. Owing to the powerful effects of this potion, none but male adults are allowed to partake of it. The first *ayahuasca* bout is quite an event in the career of a Zaparo warrior, and celebrated with feasting accordingly.

The Zaparo, in common with the majority of Indians in this region, believes in a dual existence—the good spirit, or "Spirit of Life," and

the *Munyiu*, or "Spirit of Evil:" among the northern clans the latter is designated *Zamaro*. According to their belief, if such it can be called, the Good one can, but seldom does, overcome the Evil Spirit. The latter is credited with carrying off any one he meets alone in the depths of the forest, to devour them in his lair. This I consider a neat explanation of the unaccounted-for disappearance of many who, single-handed, fall easy victims to the panther, jaguar, or boa constrictor.

They also believe in metempsychosis. As a reward for valour, the spirit of the departed one passes into the body of some ferocious jaguar or other beast of prey, and, by way of punishment, that of the coward takes up its abode in the form of some noxious or hideous reptile.

They are indisputably a practical people, so far as the preservation of their race is concerned. The aged and sickly, the fool and the helpless orphan babe, are, after a hurried consultation with the *shimanu*, ridded of their burden of life by a blow from a *macana*—usually the nearest relative undertaking this humanitarian task. Sometimes the living is interred with the dead. Theirs is an excellent rendering of "the survival of the fittest."

They consume a great quantity of game and fruit, but few cereals or tubers. The *Guayusa* or Napo tea is their favourite beverage. This is the dried leaf of a small laurel shrub, somewhat resembling the coca plant (*Erythroxylon coca*), which they also consume. During my trip I laid in quite a stock of *Guayusa*, and found it to be an excellent substitute for tea, being, if anything, slightly more aromatic. It is said they drink it of a morning by way of emetic, to rid the stomach of any surplus indigested food, but I cannot endorse the assertion. In my own case it proved an excellent sedative. The coca leaves, which they masticate, are very sustaining, and are only called into demand when they have long journeys to perform, or when their stock of *masato* (fermented yuca) is exhausted. They also distil the juice of boiled plantains by means of a primitive clay still, and obtain a nauseous, unwholesome class of rum, of which, however, they consume very small quantities. The *masato*, to which I have referred, is simply the masticated and fermented root of the yuca (*Jatropha manihot*). It is requisite that the root undergo the process of mastication, this being performed by the unmarried women, otherwise it would not ferment, and, fermenting, it loses any quality that may have been imparted to it during the process. The yuca thus treated becomes a pulpy mass, which is preserved for three or four days in earthen jars, when it becomes fit for use. A handful is worked between the fingers in a bowl of water, which becomes milky, and the fibrous parts are thrown away. It is very refreshing, though rather heady, and, in taste, bears a strong resemblance to sour milk. The *guineo* plantain, and several species of palm fruit, are treated in a similar manner, so that the Indian has a wide choice in the matter of refreshments.

When dealing with the subject of dress, I omitted to mention the charms of stringed monkey-teeth and iguana-skin bracelets affected by the gentler sex. The latter charm, which is considered the more potent, consists of thin sections of iguana tail-hide, which are slipped over the wrist when fresh and contract on drying.

The only other tribe which merits special mention, principally on account of physique, is the Coto, or Orejon, that inhabits the left bank of the Lower Napo, near its mouth. They are low in stature, and thick-set. Their physiognomy is strikingly repulsive, as they have a very broad face, square jaw, prominent cheekbones, and the thick lips and flat nose that characterize the Congo African, surmounted by long coarse black hair, beneath which is hidden a low, retreating forehead. But the most noticeable feature about them is, perhaps, the distended ear-lobe. At a very tender age they pierce the ear with a small piece of sharpened wood, which they allow to remain therein, exchanging it each day for one of larger dimensions, until the hole thus formed will admit of a large circular piece of cabbage wood, which is ornamented with a black spot in the centre. A pair I measured were slightly over four inches in diameter, and the ear-bands that encircled them resembled a carpenter's pencil. It is from this peculiarity they derive the Spanish appellation of "Orejones," or Big-ears; and it is the custom of besmearing their nude bodies with achiote, which gives them a striking resemblance to the red howler, that has earned for them the name of "Coto."

Being unable to gather any information regarding them from the traders on the main Amazon, I decided to visit one of their villages when ascending the Napo, and was fortunately assisted in this by a breakdown of the steamer's engine when almost opposite their territory.

I arrived at the village at dawn, but found only a few females and children playing around, the male population being absent, evidently upon a hunting-expedition—which, by the way, last for several days at a time. The village comprised some twenty huts, differing slightly from the usual style of Indian architecture, inasmuch as they were closed in on every side. On examination, these walls were found to be merely a continuation of the roof thatch of *yarina*, or ivory-nut leaves. There were no doors to these primitive edifices, and entry was made by lifting a loose piece of thatch. In one hut were two newly made mounds. At the head of each a spear was stuck into the earth, and on either side a stone hatchet partly embedded in the soil, and a bowl of mildewed masato. Doubtless they were graves.

In another were several *chambira* (palm fibre) hammocks, spears, stone hatchets, earthen pots, gourds, and a quantity of short lengths of cane containing poison. The stone hatchets, of which I saw a large number, are of two sizes: the larger weighing about four pounds each, and having a thirty-inch haft; and the smaller having a twelve-inch haft, and weighing one pound. These relics of the Stone Age are certainly

most unwieldy instruments, yet they manage to fell the largest trees with them, and scoop out fair-sized canoes. Where the stones come from is a mystery.

The canes containing the poison were suspended by threes from the roof. This poison, when fresh, is equally as good as that prepared by the Ticunas, but becomes innocuous after eight or ten weeks. In this substance the Indian dips the point of his arrow or spear, and inevitable death ensues from a wound inflicted by the weapon thus anointed. It is remarkable that, while causing death, this poison in no way taints the flesh of game killed through its agency, which may be eaten with impunity.

The Lower Napo abounds in fish and aquatic mammals, whereas the upper stream contains a very limited number of species. Below Coca, nearly every kind of fish found in other Amazon streams is to be met with. Those which are in principal demand are the *pirarucu* or *paiche*, the Amazonian cod, which attains to an enormous size, and rivals the huge pink *delphinus* which is so common on this river. The paiche, when salted and sun-dried, forms a staple article of consumption amongst the rubber-collectors and others in these regions. When broiled it is not unlike its marine counterpart, but, when otherwise prepared, has a disagreeable, rancid flavour. Next in importance comes the *gamitana*, not unlike a huge trout in appearance, ranging from two to four feet in length. This fish is found chiefly in the numerous lagoons that connect with the main river.

The manatee is much sought after by the natives, and the river tortoise or turtle, of which there are two varieties, yields them an abundant supply of meat and oil.

Just above the Aguarico I caught, among other small fish, three freshwater soles (*Pleuronectes lingula*), which attracted my attention, as they were the only specimens I had seen in the Amazons.

Alligators are plentiful near the mouth, but gradually disappear as one ascends, their place being taken by a beautiful large grey otter about four feet long, and bearing an exquisite fur. The fish met with on the Upper Napo comprise a number of *siluridæ*, and several varieties of the carp family. One known as the *boca-chica* (small mouth), about the size of a mackerel, is much esteemed by the Indians, who catch and dry them by thousands.

The forests throughout the Napo country abound in game, such as tapir, capybara, peccary, venison, etc., and the wild turkey, curassows, widgeon, duck, teal, and partridge.

The plants at present under cultivation are the plantain, of which there are numerous varieties, the sugar-cane, maize, mandioc, cocoa, coffee, cotton, pistachio nut, and rice. The mandioc, or yuca (*Jatropha manihot*), is to the native as bread, or rather wheat, to the European. From its tuberous root they prepare what is known as *farinha*, which

bears a striking resemblance to African *kous-kous*. To prepare it they carefully peel and cut the root into small cubes, which are placed in water and allowed to remain there from eight to ten days, the liquid being occasionally changed. At the expiration of this period, dissolution will have taken place, and the whole reduced to a mass of pulp. The pulp is taken out and kneaded in fresh water, by which means the poisonous principle is extracted. It is then sun-dried, rubbed between the hands, when it assumes an irregular granular appearance, and finally baked in a conical clay oven. When fresh, *farinha* is very palatable, but becomes musty after a short while, and infested with weevils.

At the northern angle, formed by the junction of the Curaray, there are immense plantations of wild white cocoa (*Theobroma cacao*), the fruit of which is much sought after by the monkey tribe. This plant, which is of well-known commercial value, yields a nib scarcely inferior to what is known on the market as arriba, and can be easily cultivated.

It would fill a volume to give even the most meagre description of the vegetable wealth of this feracious region; an enumeration of its cabinet woods would mean a large-sized catalogue, and the same may be said of the medicinal plants. There is one point that bears upon the subject which I would wish to make clear, and that is the distinction between the *guadua* and the water-tree.

The *guadua* is essentially a huge bamboo that attains a height of about 120 feet. It is seen frequently on the upper part of the Lower Napo, bending gracefully over the water, and at a distance presents the appearance of a weeping willow.

The *cetico*, or water-tree, is a variety of the *bombax*, or silk-cotton tree, and yields timber almost like light cabbage-wood, as buoyant as cork. This tree lines the entire length of the Lower Napo, and on its tall grey stem the maximum rise of the river is clearly defined. Its leaves are very large, palmate, and silky, and the greater part of the trunk is branchless. Before the collection of rubber became of such paramount importance, the natives dealt with the traders almost exclusively in wax, which they obtained from the hollows in this tree, where it was stored by a certain species of ant.

In concluding this paper, I must mention that gold in illimitable quantities exists in the bed of the Upper Napo. The Indians extract small quantities by washing the sand, but their primitive method of extracting the precious metal gives only the barest results. On many occasions I have taken up loose boulders, and found it adhering to their lower surface, and in handfuls of sand taken at certain points it is distinctly visible to the naked eye.

THE MANCHESTER SHIP CANAL.

By H. YULE OLDHAM, M.A.

MANCHESTER, the great industrial centre of Lancashire, is removed by a distance of 30 miles from the sea, a geographical fact which the difficulty and cost of transport over the intervening land has long impressed on the minds of its citizens.

Frequent and strenuous have been the efforts to provide easier communication by artificial means. In 1776 the Duke of Bridgewater's celebrated canal was opened, and it was between Manchester and Liverpool that in 1829 the earliest steam railway was constructed. Since this date several other lines of railway have been added between the same two towns, but the cost of carriage, instead of decreasing, has been enhanced, while the margin of profit in trade has, by the keenness of commercial competition, been steadily reduced. Within recent years the necessity of some new effort to lower the expense of transport was felt to be imperative. It was remembered that by the construction of the Bridgewater Canal the cost of carriage to the sea had been diminished by one-half, and so, with the intention of effecting a similar reduction, a new canal was projected.

A natural water connection between Manchester and the sea has always existed, the Irwell, which flows through the city, being one of the main tributaries of the Mersey, at the mouth of whose estuary lies Liverpool. As long ago as 1720 an Act for rendering these rivers navigable was passed by Parliament, and steps were taken which rendered them for many years an important line of communication. More than once in this century have proposals been made for the further development of this natural waterway, and more than fifty years ago was Manchester dreamt of as a port for ocean-going vessels. Nothing, however, of a definite nature was undertaken, and latterly the contamination of the enormous population, which has grown up on the banks of the Irwell, had reduced the character of the stream to little more than that of an open sewer, to which no less emphatic an epithet than inky could be applied.

Within the last few years, however, a great change has been effected, and the dream at length realized. The foul and shallow stream has been replaced by a splendid waterway stretching to the sea, wider and no less deep than the Suez Canal, and the largest ocean vessels can sail up to and discharge their cargoes on the quays of Manchester, now a duly constituted port of the United Kingdom.

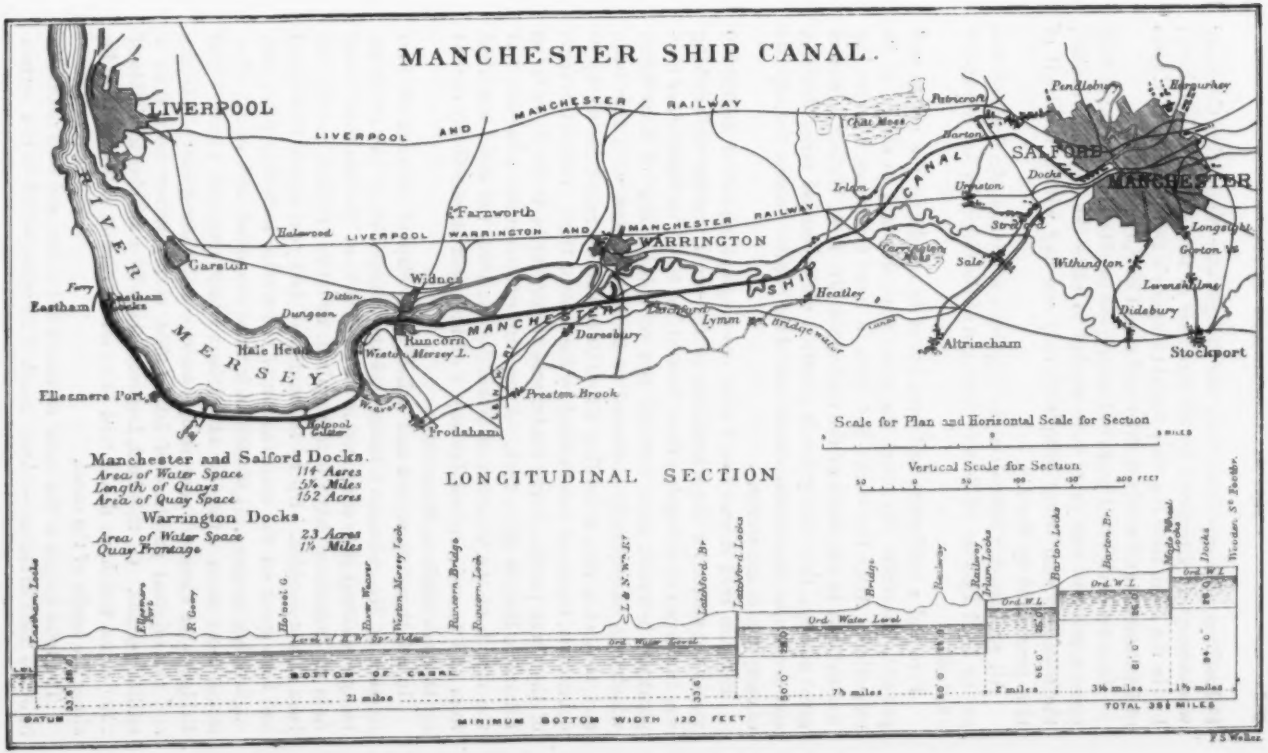
Brindley, the famous engineer of the Bridgewater Canal, when asked what he considered the object of rivers, is reported to have replied, "To feed canals, of course." The engineer of the new waterway between Manchester and the sea has expanded this idea by converting a river

bodily into a canal. The Manchester Ship Canal is essentially the lower portions of the rivers Irwell and Mersey straightened, deepened, widened, and controlled; in fact, the river system has become so modified that, instead of the Irwell being a tributary of the Mersey, these two streams might now almost more aptly be described as the principal feeders of the Ship Canal. One obvious reason for adopting, as far as possible, the actual course of the existing streams lay in the great difficulty and cost of obtaining any other route through so densely populated a district as that which had to be traversed.

Largely owing to the persistent advocacy of Mr. George Hicks, the first practical step towards the construction of the canal was taken in June, 1882, when, at a meeting convened by the late Mr. Daniel Adamson at his house near Manchester, a provisional committee was formed. In December of the same year the first Bill was deposited in Parliament.

At the outset there had been two schemes in the field, one proposed by Mr. Hamilton Fulton for a level, lockless, and therefore tidal channel; the other, that of Mr. E. Leader Williams for a canal with three locks. As there is a difference of 60 feet between Manchester and Liverpool, the former plan would have involved enormous excavations in construction, and after completion the constant expense of lowering and raising all goods to and from the deep basin in Manchester in which the ships would have lain. The latter plan was therefore, subject to modifications, adopted.

The next two years were spent in a fierce fight for Parliamentary sanction. Opposition, as was natural, came chiefly from the existing Bridgewater Canal, the railway companies, and the Mersey Docks and Harbour Board representing the interests of Liverpool. The two former voiced the natural alarm of existing carrying companies at the prospect of a new competitor, but the latter brought forward the more serious contention that the construction of the proposed canal would lead to the silting up of their harbour. A glance at the map will explain the contention. The Mersey at its mouth widens into a large estuary 27 square miles in extent, communicating with the sea by a narrow channel some half-mile wide, on the edge of which lies Liverpool. At each turn of the tide a large volume of water, owing to the great size of the estuary, rushes through this channel and thus scours it by natural means. According to the original scheme, the canal was to have been brought down the middle of the estuary from Runcorn by means of training walls and a dredged channel, but it was objected that this would lead to a silting up of the sides of the estuary and consequent alteration of those natural conditions, which assist in keeping the channel at Liverpool clear. With no little ingenuity, the promoters of the canal overcame this objection by altering their original plan so as to bring the canal along the edge, and not down the middle. This will explain the apparently unnecessary detour round the Cheshire shore from Runcorn


MANCHESTER SHIP CANAL.
LIVERPOOL
LIVERPOOL AND MANCHESTER RAILWAY
LIVERPOOL WARRINGTON AND MANCHESTER RAILWAY
Chat Moss
Patricroft
Pendlebury
Eccles
Barton
SALFORD
MANCHESTER
Docks
Irlam
Urmston
Stretford
Longsight
Gorton
Withington
Levenshulme
Didsbury
Stockport
Farnworth
Halewood
WARRINGTON
Garston
Ferry
Eastham
Eastham Locks
Dutton
Dungeon
Widnes
Runcorn
Weston Point
Mersey L.
Hale Head
RIVER MERSEY
Ellesmere Port
Weaver R.
Helsby
Frodsham
Preston Brook
Daresbury
Lymm
Bridgewater Canal
Heatley
Lach Dyrr
Sale
Altrincham
Scale for Plan and Horizontal Scale for Section
Vertical Scale for Section
LONGITUDINAL SECTION
Manchester and Salford Docks.
Area of Water Space 114 Acres
Length of Quays 5½ Miles
Area of Quay Space 152 Acres
Warrington Docks
Area of Water Space 23 Acres
Quay Frontage 1½ Miles
Eastham Locks
Ellesmere Port
R. Gowy
Ellesmere L.
River Weaver
Weston Point Lock
Runcorn Bridge
Runcorn Lock
L. & N. W. Ry.
Latchford Br.
Latchford Locks
Bridges
Railway
Railway
Irlam Locks
Barton Locks
Barton Br.
Mode Wheel Locks
Docks
Weaste, St. Boltby
Ord. W. L.
Ord. Water Level
Level of H. W. Spr. Tides
BOTTOM OF CANAL
21 miles
7½ miles
2 miles
3½ miles
1½ miles
TOTAL 35½ MILES
DATUM
MINIMUM BOTTOM WIDTH 120 FEET
F.S. Walker

to Eastham. All opposition from the Bridgewater Navigation Company was subsequently removed by the purchase of the latter's undertaking; but in the mean time the Ship Canal Company's Bill passed both Houses of Parliament, and received the royal assent in August, 1885.

Some two and a half years had been spent in obtaining Parliamentary powers, and now two years were needed to raise the requisite capital, the necessary sum being completed only one day within the limit of time prescribed by the Act.

All preliminary difficulties having been overcome, the first sod was cut by Lord Egerton of Tatton, chairman of the Company, on November 11, 1887.

Five and a half years had been spent in obtaining the means and power to construct the canal, six more were destined to elapse in its execution. After the works had been in hand two years, a severe loss was suffered in the death of the contractor, Mr. T. A. Walker, a man of great ability; then heavy floods occurred which caused large damage, and the deeper the cuttings were carried the greater became the expense of carrying on the works.

Early in 1891 it was found that the original capital of £8,000,000 would not suffice for the completion of the canal, and the undertaking was in danger of collapsing from lack of funds. The Manchester Corporation, however, came forward and provided a loan of £3,000,000, which was subsequently increased to £5,000,000, and with this help, and that of a sum exceeding £2,000,000 already raised on mortgage debentures, the canal was finished by the close of 1893. Before this some of the lower portion, being ready, was thrown open to traffic as far as Ellesmere Port, in July, 1891. A year later Saltport was established at the mouth of the Weaver; on November 25, 1893, the canal was filled from end to end; and on January 1 of this year it was finally opened for through traffic to Manchester.

In all, therefore, eleven and a half years elapsed between the first meeting at Mr. Adamson's house and the completion of the canal, six being the actual time consumed in its construction. No less than eleven Acts of Parliament have been required, and the original capital has been almost doubled. Up to the middle of last year about £9,000,000 had been spent on the construction of the works, including plant and engineering expenses, £1,000,000 in interest on capital, and, among other items, more than £150,000 in Parliamentary expenses alone. The Bridgewater Canals Undertaking cost one and three-quarter millions, and the original purchase of land (4520 acres) rather more than a million pounds. Of this land, however, there is a surplus available of 2500 acres, which no doubt will have an increasing value, as they lie along the banks of the canal.

The total length of the canal measures 35½ miles, and falls naturally into two main divisions—a lower reach of 21 miles, which is to a certain

extent tidal, from the entrance at Eastham to the locks at Latchford; and an upper portion of 14½ miles, subdivided by three locks into four smaller sections.

The rise in the upper portion is 60½ feet above the ordinary water-level of the lower reach. As regards this latter section, the condition of affairs will be best understood by reference to the accompanying table of tide levels, which are calculated from the Datum of the old Dock Sill at Liverpool.

	ft.	ins.		
Average high water equinoctial spring tides * ...	21	1	above	datum.
Mean high water	15	6	„	„
Ordinary canal level	14	2	„	„
Mean tide level	4	9	„	„
Mean low water	5	6½	below	„
Lowest low water equinoctial spring tides ...	10	4	„	„

It will be seen that the ordinary water-level in the tidal portion of the canal is 9½ feet above the mean tide level, and this would represent the rise at the entrance locks at Eastham for a ship approaching at mean tide, but at high tide the level of the water outside is apparently more than a foot above that of the canal. This is, however, not actually the case, for three immense tidal openings, each 200 yards long, at Ellesmere Port, Weaver Mouth, and Runcorn, admit the water to the canal whenever it rises outside to a height above the ordinary water-level within, thus equalizing the levels, and preventing the somewhat slender barrier, which in parts separates this portion from the estuary, from being crushed in by the pressure of a high tide.

Owing to this arrangement there should be no lack of water in the lower section of the canal, as at every mean high tide the sea will more than supply any deficiency. Accordingly, streams entering this section are treated in a different fashion from those which flow into the portion above Latchford. There, where a scarcity of water may be felt, all streams, from the Mersey down to the smallest brook, are suffered to discharge their waters into the canal; but in the lower section they are either, when small like the Gowy, siphoned through iron tubes under the bed of the canal into the estuary beyond, or, when large like the Weaver, provided with a long series of sluices for the discharge of surplus water through the bank opposite the point of entry.

In width the canal varies slightly at the surface-level, but its navigability is best indicated by the minimum width at bottom, which is 120 feet, while that of the Suez Canal is only 72 feet. In point of depth these two canals are similar, the minimum in each case being 26 feet; but the lock sills of the Ship Canal have been made 2 feet

* These figures, as well as the others used in this article, are taken from the official publications of the Manchester Ship Canal, kindly supplied by the General Manager, Mr. Marshall Stevens.

deeper, so that, if necessary, the depth throughout could be increased to 28 feet.

The locks are five in number, without counting those at the sides admitting other canals, and, with the exception of the entrance ones at Eastham, which are slightly larger, consist of a large lock capable of holding any but the very largest vessels now afloat, and a smaller one side by side; but, as the canal is really a modified river, each set of locks is flanked by a series of sluices to regulate the discharge of flood-water. At the Mode Wheel locks, for example, the last of the series, there are two locks, one 600 feet by 65 feet, the other 350 feet by 45 feet, for the smaller craft, and four sluices each 30 feet wide.

One of the chief difficulties which beset the construction of the canal lay in the number of established routes crossing its line, since a water-way for masted ships requires a clear headway of considerable height. Ordinary roads could be managed by means of swing-bridges, and no less than seven have thus been dealt with. But the railways, of which five cross the canal, required fixed bridges. To deal with the line which crosses the Mersey on a high viaduct below Runcorn was found to be impracticable, so this, which unfortunately is only 75 feet above the ordinary water-level of the canal, decided the height of the rest. In each of the other cases a viaduct at a similar height and with long approaches was constructed near the existing lines, so that the traffic was never interfered with, but simply diverted on to the new lines when ready. Two ordinary roads having been similarly dealt with, there are six high-level bridges 75 feet above water-level, in addition to the old Runcorn viaduct, crossing the canal.

Two other obstacles presented difficulties of a more novel character. The one was the Vyrnwy aqueduct bringing Liverpool's new water-supply from the Welsh hills, the other the old Bridgewater Canal. The former has been treated like the river Gowy, and taken through a tunnel under the bed of the canal; the latter, however, was less easy to deal with, and in its treatment represents one of the most brilliant engineering feats of the whole undertaking. To carry the old across the new canal, a swing-bridge has been built, which is pivoted on an island in the centre of the latter. When a ship has to pass, watertight gates are closed at each end of the bridge, and a complete section of the canal swings round and back again without a drop of water being lost.

Some idea of the magnitude of the work done in constructing this remarkable canal may be gained from the fact that 51,000,000 cubic yards of soil and rock were excavated in the task, more than 16,000 men and boys and 100 steam-excavators being employed, and 10,000 tons of coal per month consumed when the work was in full swing.

As an engineering triumph the canal is remarkable; how far it may prove a commercial success remains to be seen. Certainly it has cost a large sum of money, greatly in excess of the original estimates, but so also

did the Suez Canal. All the work done is of an extraordinarily massive and substantial character; the dock space at the terminus is immense, over 100 acres in extent, with 5½ miles of quays, which are a model of good workmanship and wise provision for possible requirements in the future. The largest lock can be cleared in eight minutes, and the bridges swing open on the approach of a vessel, causing no delay, so that Manchester can easily be reached in six hours from Liverpool.

Manchester is now a port of the United Kingdom; is it destined to become a leading one? In point of population, there is no reason why it should not. Within a radius of twelve miles round Manchester there is a population twice as great as that in a similar area round Liverpool, and it has been calculated that in the districts which are nearer to the Ship Canal than to any other ocean steamship port there is a population of no less than 7½ millions. Liverpool, which has increased a hundred-fold in less than two centuries, is one of the most remarkable products of Lancashire; it will be interesting to see how far its prosperity is affected by the establishment of a new port nearer those industrial centres which have so greatly helped to make it what it is.

There are, however, two drawbacks likely to militate against the success of the new venture at the outset, if not longer. One is the lowness of the bridges, which only allows a headway of 75 feet above the ordinary water-level, and therefore necessitates the lowering of topmasts in the case of many vessels—an operation which a sailor describes as often being as bad as drawing a tooth. The other is with regard to the water itself. The Mersey and its tributaries are not steady streams. Coming from the rainy side of the hills, with a comparatively short course to the sea, they are apt in winter to sweep down in furious floods carrying quantities of silt. But perhaps their summer mood will be even more difficult to deal with. Any one who has seen the Irwell or Mersey in a dry season, creeping along a black shadow of itself, cannot help wondering where the water will be found to float the hoped-for fleets. A great undertaking, however, is almost complete for supplying Manchester with water from Thirlmere, in the Lake District. In times of need some of this enormous supply might be used, and the curious spectacle seen of ships floated from Manchester to the sea with water partly brought from Cumberland. Anyhow, energy and fertility of resource are qualities not altogether lacking in Lancashire, and the canal is not likely to prove a failure from want of them, whatever difficulties it may have to contend with.

It is noteworthy that the first railway was tried between Manchester and Liverpool; how many imitators will the new experiment produce?

A NOTE ON THE GEOGRAPHY OF FRANZ JOSEF LAND.

By ARTHUR MONTEFIORE, F.G.S.

The selection of Franz Josef Land as the immediate objective of Mr. Frederick G. Jackson's expedition and the route for his advance in a northerly direction offers so high a probability of reward, that one can scarcely fail to be glad that it is the English expedition which has decided on what appears to afford the surest approach to a fertile field of geographical discovery. It will be remembered that in the *Geographical Journal* for April, 1893, Mr. Jackson pointed out briefly the main advantages of this route, and those members of this Society who have made Arctic geography a special study will not fail to recognize their particular merits. In the discussions which have arisen from time to time at the meetings of the R.G.S., our leading Arctic authorities have dwelt on the great importance of Franz Josef Land as a route to the more immediate vicinity of the North Pole, but it will suffice if I quote, as an example of "expert" opinion, one sentence from the concluding passages of Admiral Markham's 'Life of Sir John Franklin' (London, 1891). "In order to carry this (Polar exploration) out to a successful issue, our attention and our energies should be directed towards the little known Franz Josef Land, for it is in this direction that the greatest prospect, almost amounting to a certainty, of success will be obtained." That is the opinion of an Arctic explorer of great and successful experience, deliberately expressed, and supported by arguments with which students of Arctic geography are familiar, and with which they can scarcely fail to agree.

Now that Mr. Jackson will this summer lead an expedition to Franz Josef Land—a scientific expedition fully and without stint equipped at the cost of Mr. Alfred C. Harmsworth, an Arctic enthusiast and a Fellow of our Society—one naturally turns from the contemplation of the *Fram*, now lying, as we believe, in the strict embrace of oceanic ice, and from the interesting attempt which Peary is making to establish the insularity of Greenland. For after a lapse of many years, our own countrymen are taking up the Arctic work in which this country has achieved such great things—not merely in the generations immediately behind us, but during the whole period of Arctic exploration. With the splendid work which the loss of Franklin called out we are all familiar; but how many of us can recount the full tale of the Arctic expeditions which sailed from England before the present reign? It is a long list, for they are sixty, save two; and, although none attained its object, each added something to its own and its country's credit.

The immediate interest, then, which surrounds the little-known Franz Josef Land may make this brief note on its geography useful for reference. I have collected the facts almost entirely from the journal of Payer, who led the only expedition which has penetrated the country;

but the *résumé* of the journal of Mr. B. Leigh Smith, who twice visited and once wintered on the southern coast of Franz Josef Land, is useful as recording several minor discoveries in the south-west, as well as affording valuable information as to the character of the winter climate. This *résumé* appeared in the *Proceedings* of the Royal Geographical Society, vol. iii. pp. 129–145, and vol. v. pp. 204–220. It is to Payer, however, that we must turn for information on the geography of the interior, the geology and zoology of the country, the conditions of travel, the northward development of the land, and the prospects of geographical discovery in the higher latitudes.

Franz Josef Land was discovered by the Austro-Hungarian expedition on August 30, 1873. The *Tegetthoff*, which had been slowly drifting, fast locked in the ice, since August 20, 1872, was then in 79° 43′ N. lat. and 59° 33′ E. long. Weyprecht and Payer loyally named the new land after their sovereign, and the high bluff they had first seen Cape Tegetthoff. It was not until November 1, however, that the party landed on Wilczek Island, their ship having then drifted to 79° 51′ N. lat. and 58° 56′ E. long. Three hasty visits to this island —insufficient even to determine its configuration—were all that could be done before winter prevented further work. This was the second winter which the ship had passed, locked in the ice. The return of the sun on February 24 found the preparations for a sledge journey well advanced, and on March 10, a party of seven men and three dogs, with Payer in command, left the *Tegetthoff* for a reconnaissance in the neighbouring islands. This terminated on the 19th. On March 26, Payer, with a similar number of men and dogs, again left the ship; on April 1 he reached Austria Sound, and, travelling on its frozen surface, he successively attained Cape Tyrol (April 4), Rawlinson Sound (April 8), Cape Brorok, 81° 45′ N. lat. (April 11), and finally Cape Fligely, 82° 5′ N. lat. (April 12). Returning the same day southwards, he regained the ship on April 23, a remarkable sledging record. A third journey—this time to the westward—was begun on April 29, and concluded on May 3, the most westerly point reached being the south-east coast of McClintock Island, 56° 25′ E. long. It is to the second of these journeys that we are wholly indebted for the geography of the interior.

As far as a country whose eastern and western limits are unknown can be described in conventional terms, Franz Josef Land may be regarded as a large insular mass with a chain of small islands lying along its southern coast, the most considerable of which, taken from east to west, are Salm, Hall, M'Clintock, Hooker, Northbrook, and Bruce Islands. The most southern point of the mainland is Cape Grant, 80° 5′ N. lat., but portions of the island chain extend south of the 80° parallel. Westward exploration by the Austrians ceased a little west of 57° E. long., but Mr. Leigh Smith, by actual navigation, extended this to 44° 45′ (west of Cape Neale), and saw the land stretching

away, cape beyond cape, to about 42° E. long. On the east nothing is known beyond 62° E. long., so we may say that the known parts of Franz Josef Land stretch across 20° of longitude (on a mean latitude of 80° 30′ N.). The most northerly point yet reached is Cape Fligely (82° 5′ N. lat.) and Petermann Land was observed in about 83° 10′ N. lat. The land itself is cleft asunder, almost due north and south, by that dominating feature of its known interior—Austria Sound. On the west lies Zichy Land, separated from the island chain by Markham Sound, a south-westerly prolongation of Austria Sound; and on the east there rises Wilczek Land, with its great Dove glacier 60 miles wide. On the parallel of 81° N. lat., Austria Sound is at its narrowest, and between this point and 81° 40′ it spreads out both east and west, forming two wide-mouthed bays, and opening up several deep fiords. At 81° 40′, the latitude of the southern extremity of Prince Rudolf's Land, the sound forks, the branch running north-east being called Rawlinson Sound, and that trending north-west preserving the original name. Prince Rudolf's Land is the most northerly portion of the Franz Josef Land group which has been visited. It lies, on the 82° parallel, between 57° 50′ and 60° 15′ E. long., these being the longitudes of Capes Germania and Rath, respectively its most westerly and easterly points in this latitude. After attempting in vain to ascend Rawlinson Sound, Payer turned back, and, advancing along the west coast of Prince Rudolf's Land, reached Cape Fligely, 82° 5′ N. lat., the most northerly point yet attained in this direction. The weather was fortunately clear, and he saw, some 60 or 70 miles due north of him, the mountains of another land, which he called Petermann Land; and away to the westward, stretching in a north-easterly direction from 82° N. to 82° 25′ N., the distant but yet distinct outlines of King Oscar Land. Between Cape Fligely and this land there stretched a wide expanse of open water, and beyond the water a close formation of old ice; north, too, of Cape Fligely lay open water (but "of no great extent") and ice. The connection of Petermann Land with Wilczek Land or Prince Rudolf's Land was not determined, but a protruding cape about 82° 20′ N., which received the name of Cape Sherard Osborn, undoubtedly was part of Prince Rudolf's Land. Although it is possible that Petermann Land is divided from Wilczek Land by Rawlinson Sound, it is more probably a continuation of it.

Austria Sound stretches a surface of ice from Wilczek Land to Zichy Land, but it is not a wholly unbroken one. In 1874, at any rate, a wide expanse of water lay at its southern extremity immediately north of Hall Island. Again, there are at least ten islands of noteworthy extent rising out of the sound, Wiener Neustadt, just south of 81°, and Rainer, 81° 20′, being the most considerable. The ice of Austria Sound is on the whole smooth and level, but from time to time long narrow barriers of hummocky ice occur, and the whole of the known extent of Rawlinson Sound is extremely rough, and this rough ice protrudes

thence into Austria Sound, narrowing down to its southernmost limit at Andrée Island 82° 25′. Still, the whole length of Austria Sound, from 80° 40′ to 81° 50′, may be traversed on what is practically level and easy ice. It is worth noting that the great portion of the ice was not of more than one year's growth. This, of course, leads one to hope that in the month of September the Sound would be navigable.

Bold and intensely boreal are the coast-lines presented by Franz Josef Land east and west of Austria Sound. From mountains, conical but not volcanic, vast glaciers descend to the sound. All is snow and ice, and wherever rock surfaces are exposed they are covered with a thick layer of ice, the colour of the rock being indistinguishable. Even the most precipitous cliffs, and the vertical basaltic columns which continually crop out, tier upon tier, are (at least in April) encrusted so thickly with ice that Payer could find no word more apt for them than "crystallized." (This may be partly owing to the high degree of humidity.) The formation being basaltic, we are not surprised that Franz Josef Land present no continuous mountain chain—that we should find, rather, isolated groups of the plateaux, cones, and table-topped hills characteristic of the formation. Payer[1] compared the mountain forms of Franz Josef Land to those of Western Greenland, and contrasted them with those of East Greenland, parts of Spitzbergen, and Novaya Zemlya. The average height to which the mountains attain is 2000–3000 feet, but in the south-west this rises to about 5000 feet. If we advance northward along Austria Sound, and confine our attention to its eastern shores, the Wullersdorf mountains (3000 feet) would form the chief feature of the southern end; north of these there spreads a wide glacier until the rock eminences of Capes Heller and Selmarda are reached. Immediately north of these rise the mountains of La Roncière Peninsula, extending from 81° to 81° 10′ N., and lying roughly parallel to the southern limit of the great Dove glacier. This glacier is at least 60 geographical miles wide, C. Buda Pest, 82° N., which protrudes into Rawlinson Sound, marking the most northerly known limit. Still going north, we come to Prince Rudolf's Land, which has an elevation of about 3000 feet. The whole of the south-east side explored is occupied by a great glacier, the Middendorf glacier, having a sea wall several hundred feet in height; but on the west side the precipitous cliffs and capes expose rock surfaces. Returning from Cape Fligely by the western shores of Austria Sound, similar rock eminences and precipitous table-topped cliffs alternate with glaciers, but the former are far more continuous than on the east, while there is no great glacier like the Dove or the Middendorf. As might be expected, the coast-line is more developed, and the fiords deeper and more frequent.

The geology of Franz Josef Land promises to be of great interest. Speaking briefly, one may say that, as far as is now known, it is similar

to that of Spitzbergen. The Dolerite, which is so familiar to the traveller in that group as well as in Greenland, is the dominant formation of Franz Josef Land. The lowest rocks found are of the Oxford Clay; above them are cretaceous rocks (with fossil conifers); and above these the flow of Dolerite. It is probable, I think, that in the extreme north of the Franz Josef Land group, the carboniferous rocks which dip and are lost in Novaya Zemlya will reappear. Though imprudent, it is almost safe to predict that the geological formation of the immediate region of the Pole will prove to be carboniferous.

There has not as yet been a good opportunity for examining the flora of Franz Josef Land, but it may be described as representative of an Alpine zone about 1000 feet higher than that which is typified by Spitzbergen or Novaya Zemlya. Patches of tiny flowering plants occur, and Mr. Grant (of Mr. Leigh Smith's expedition) was able to supplement—near Eira Harbour—the list given by Payer (vol. ii. p. 88). For Mr. Grant's list, reference should be made to *Proceedings* R.G.S., vol. iii. p. 134. Prominent in the lists are, as we might expect, several saxifrages and the familiar *Ranunculus nivalis* and *Papaver nudicaule*. A summer in Franz Josef Land will doubtless cause several additions to be made.

The fauna of Franz Josef Land presents great encouragement to the explorer. Even in mid-winter bears are plentiful, while in the less severe seasons they occur in great numbers, almost appearing to live and move gregariously. Mr. Leigh Smith's summer visit and the winter which he subsequently spent on Cape Flora (Northbrook Island) most clearly corroborated this very important point—that animal life abounds during the genial season, and that bear and walrus are hardly less plentiful in the winter (thirty-four bears and twenty-four walrus having been shot in the winter, the remarkable openness of water throughout that season chiefly accounting for this). Birds are very numerous, Mr. Leigh Smith noticing their first appearance, flying north, as early as February 8. So far no reindeer or ptarmigan have been found, but there is a slightly misleading statement in the report of the *Eira's* second voyage (*Proceedings* R.G.S., vol. v. p. 210), viz. that hares were not found by the Austrians. It is true that Payer, in his rapid journey up and down Austria Sound in the month of April, did not meet with any hares, but he distinctly states that he found traces of them.

The winter temperature of Franz Josef Land—as far, at any rate, as its southern coasts are concerned—affords evidence of some ameliorating influence. The occasional rise of temperature to a high degree, though significant, is not of such importance as the fact of the high average means. The *Tegetthoff* wintered in 79° 51′ N. lat. (*not* 79° 43′, *vide Proc.* R.G.S., vol. v. p. 209), and the Leigh Smith party about five miles more northerly, but nearly 100 miles further west. On the *Tegetthoff*, the means of November, December, January, February, March, and April were

respectively, − 15·72°, − 19·93°, − 12·1°, − 19·36°, − 9·53°, and + 5·72° F.; while on Cape Flora we have recorded for November, − 1·25°; December, + 4·79°; January, − 25·7°; February, − 26·7°; March, − 1·4°; and April, − 1·24° F. Just as there were exceptionally high temperatures, so there were low temperatures. In January, February, March, with the Leigh Smith party, there were records of − 43° F. (below which the thermometer did not register); and the Austrians, for the same months, recorded minimums of − 50·5°, − 47·8°, − 51·0° F. The prevailing winter winds are from the east-north-east. The summer fogs are frequent, and there is a slight precipitation of rain. The low-lying clouds and fogs, though depressing and troublesome, have a silver lining, for they retard the escape of the land's heat.

It is to take up the fascinating exploration of Franz Josef Land where it was laid down; to advance northward up Austria Sound towards and, I hope, *beyond* Petermann Land; to discover the relations of land masses and seas yet to be surveyed; and to investigate the geology, zoology, and botany of that unknown region, that Mr. Frederick Jackson and Mr. Alfred Harmsworth are devoting—the one his energies, the other his wealth, and both their patriotic enthusiasm, in the expedition with which their names are connected.

RECENT AFRICAN LITERATURE.

By E. G. RAVENSTEIN.

Beginning our survey of recent African literature with South Africa, we may fairly give the precedence to Mr. Selous' recent work,* which deals with that redoubtable hunter's explorations and pioneer-labours since 1881. That a work written by Mr. Selous should abound in hunting-stories is only what might be expected. It is not, however, merely a book written for the gratification of sportsmen, for it presents very ample information on the country, its resources, inhabitants, and recent history, in which Mr. Selous played so conspicuous and commendable a part. Information coming from so experienced a traveller, of whose thorough knowledge and good faith there can be no doubt, should be received with confidence. When speculating on the builders of Zimbabwe, Mr. Selous accepts the hypothesis that they came from Southern Arabia, but denies absolutely that they were possessed of a high degree of civilization. On the contrary, they were a "rude" people, not even possessed of written characters, and to describe the remains of their buildings as "ruined cities" appears to him to be a gross exaggeration. This is true, no doubt. At the same time it is possible that

* 'Travels and Adventures in South-East Africa,' by Fred. Courteney Selous. London (Rowland, Ward & Co.), 1893.

these ruins may not be of Arabian origin at all. When first discovered or heard of, more than three hundred years ago, they were identified with Solomon's Ophir or Sophira. There was a famous emporium of that name in the Gulf of Cambay, the inhabitants of which were no strangers to Phallic worship, and it is quite possible that ships from India were carried by the monsoons to the coast of south-eastern Africa. Even settlers from the Malay Archipelago may have found their way to this part of the world, just as they found their way to Madagascar.

Further excavations at Zimbabwe have been made since Mr. Bent's visit by Sir John C. Willoughby, who has published a little book on the subject, illustrated by very instructive plans.*

Dr. James Johnston's bulky and well-illustrated volume † may be read with some profit by those credulous souls who labour under the mistake that all parts of Africa are equally well adapted for European settlement, and that the accounts furnished by missionaries may be implicitly trusted. The author, a Scotchman long resident in Jamaica, landed at Benguela on May 18, 1891. He travelled by way of Bihe to the Barotse valley, traversed Bechuana and Mashona Lands; then crossed the Zambezi, paid a flying visit to Lake Nyasa, and finally, on October 10, 1892, reached Chinde. He travelled as a "friend" of missions, and was accompanied by a few Jamaica negroes, whose services he thought might be utilized in the Christianization of Africa; but probably never have missionaries been spoken of in more contemptuous terms by their bitterest enemy. The officials of the South African Company and H.M. Commissioners in Nyasaland fare no better, and altogether the "reality" as revealed to us by the author does not prognosticate a happy and prosperous future for that large section of Africa which he saw in the course of what, after all, was but a flying visit. However, even a pessimist may do some good, and some of the "facts" stated deserve attention. That Dr. Johnson himself takes a more hopeful view of the future than might seem to be warranted if we generalized merely from the statements made in various parts of his volume, is proved by his concluding chapter, "A Retrospect."

Among other books dealing with South Africa, a foremost place must be accorded to Mr. John Noble's 'Official Handbook,' ‡ which appears as a second edition of the gaily-coloured 'Handbook to the Colonial Exhibition.' It is a very treasury of information, containing contributions from a large number of specialists, and dealing with the

* 'A Narrative of Further Excavations at Zimbabya,' by Major Sir J. C. Willoughby. London (G. Philip & Son), 1893. Compare *Geographical Journal*, 1893, II. p. 440.

† 'Reality versus Romance in South Central Africa,' by Jas. Johnston, M.D. London (Hodder and Stoughton), 1893.

‡ 'Illustrated Official Handbook of the Cape and South Africa,' edited by John Noble. Cape Town (Juta), 1893.

country and its resources, the native tribes, and the history not only of Cape Colony, but also of all other British territories in South Africa, as far as the Zambezi. The very full monograph on 'Diamonds and Gold in South Africa,' which Mr. Th. Reunert contributed to this Handbook, has been published separately, with numerous additions,* together with sections of the Diamond Fields, a geological map of the Transvaal, and ample mineral statistics.

Mr. H. Anderson Bryden's 'Gun and Camera in Southern Africa'† is essentially a book for sportsmen and pioneers. The author, in the course of a year, wandered over Bechuanaland, the Kalahari, and the Ngami country, and confirms the rapid extinction of all big game. The quagga is to be met with no longer; the elephant, giraffe, and hippopotamus are becoming very scarce. Incidentally, the author supplies information of immediate practical importance. His sketch of Khama, the Bamangwato chief, will be read with interest, and those desirous of learning more about that remarkable African may be referred to Mrs. Wyndham Knight-Bruce's little book.‡

A very valuable contribution to our knowledge of Zulu arts and industries has been made by Mr. Hendrik P. N. Müller, whose collection has been figured in a sumptuously printed work of 271 plates.§ The collector himself has furnished some ethnographic notes on the tribes among whom these interesting objects were gathered, supplying at the same time the music for native songs which may be heard on the Zambezi, whilst M. J. F. Snellemann gives a concise description of each plate.

Of a more popular type are two little books by ladies—the one, by Mrs. Barkly,‖ deals with life on the frontier of Basutoland, where the authoress stayed in 1877–1881; whilst the other, by Lady Blennerhasset,¶ introduces us to some of the mining centres of South Africa. Lady Blennerhasset went out as a hospital nurse, accompanied by Miss Lucy Sleeman. She visited Kimberley and Johannesburg, and subsequently paid a flying visit to Massikessi, Umtali, and Mtasi. Unusual frankness is displayed in writing about the Europeans met with.

Crossing the Zambezi, we meet with Mr. D. J. Rankin, one of the

* 'Diamonds and Gold in South Africa,' by Theodore Reunert. London (Stanford), 1893.

† London (Stanford), 1893.

‡ 'The Story of an African Chief, being the Life of Khama.' London (Kegan Paul), 1893.

§ 'Industries des Cafres du Sud-est de l'Afrique.' Collection recueillie sur les lieux par H. P. N. Müller. Description des objects représentés par J. F. Snellemann. Leiden (Brice), 1894.

‖ 'Among Boers and Basutos,' by Mrs. Barkly. London (Remington), 1893.

¶ 'Adventures in Mashonaland,' by two Hospital Nurses. London (Macmillan), 1893.

early pioneers of Nyasaland,* and best known as the "discoverer" of the Chinde mouth as a practicable waterway. His work deals somewhat disjointedly with explorations carried on between 1883 and 1891, the results of which have already been published in the *Scottish Geographical Magazine* or elsewhere. The author speaks hopefully of the future of Nyasaland, notwithstanding the difficulties presented by the labour problem.

Captain Lugard's bulky volumes quite naturally link British South Africa with East Africa, for their author did valiant duty in the defence of Karonga, on Lake Nyasa, before he undertook the expedition to Uganda, with which his name is more especially associated. The geographical results of Captain Lugard's expedition have already been fully dealt with in a paper read before the Society (see *Proceedings* R.G.S., 1892, p. 817).† His work, however, enters very largely into questions which are not strictly geographical, and all those who take an interest in the present condition and future development of our "East African Empire" will find in it a mass of information of a useful and practical nature. That the affairs of Uganda, and more especially Captain Lugard's strange relations with the missionaries, should occupy a large space, is only what might have been expected. We believe that none will rise from a careful perusal of this portion of his work without arriving at a strong conviction that Captain Lugard's conduct of the mission entrusted to him was marked by honesty of purpose and judiciousness of action.

The questions of slavery and slave-trade, commercial possibilities and the labour problem, the methods of transport—the author recommends the employment of camels—and the future government of the vast territories which have recently been incorporated with the British Empire, are dealt with at large, and should be read in the light of Sir Gerald Portal's report recently published. A praiseworthy feature of the work consists in the large number of maps which illustrate it.

If any further proof were wanted that a thorough scientific training best qualifies a man for exploring an unknown country, it would be furnished by the publication of Dr. Stuhlmann's book.‡ It is not often that a work of such high merit and varied interest is brought to the notice of the student of African geography. No department of knowledge at all bearing upon geography seems to have been unfamiliar to the German explorer, and hence his descriptions of scenery, vegetation, the fauna and the inhabitants are instinct with life and historic truth.

* 'The Zambesi Basin and Nyassaland,' by Daniel J. Rankin. Edinburgh and London (Blackwood), 1893.

† 'The Rise of our East African Empire,' by Captain F. D. Lugard. Edinburgh (Blackwood), 1893.

‡ 'Mit Emin-Pascha ins Herz von Afrika,' von Dr. Franz Stuhlmann. Berlin (Reimer) 1894.

Dr. Stuhlmann was not content to supply a map based upon numerous observations for latitude; he also sent home valuable geological and botanical collections. These latter are to be described in separate works, and the bulky volume now before us merely contains the narrative of his travels.

Dr. Stuhlmann, after a preliminary exploration of Usambara, in 1888, joined Emin Pasha at Bagamoyo, in April, 1890. Marching through Mpwapwa and Ugogo—where game appears to have become plentiful, since a limitation has been put upon the importation of fire-arms and ammunition—the expedition reached Tabora on July 29, and soon afterwards hoisted the German flag there. It then marched northward to the Victoria Nyanza, reaching Bukoba, where a now flourishing station was established, on November 15. After a flying visit to Uganda, in January, 1891, Emin Pasha and Dr. Stuhlmann started for the north-west.* They crossed Karagwe and Ankoli; passed close to the Mfumbiro volcano; skirted the western shore of the Albert Edward and the snow-clad Ruwenzori; and ultimately reached the plateau to the west of the Albert Nyanza, where the Sudanese were encamped. There can be no doubt that Emin, anxious to wind up his African career by a notable exploit, intended to push on to Lake Chad and Bornu; but the dense forests, the want of food, and the outbreak of small-pox frustrated this plan. Dr. Stuhlmann was ordered to return to Bukoba, where he arrived on February 15, 1892; whilst Emin, ever hopeful, remained behind, only to perish miserably when almost within sight of the Congo.

One of the most attractive features of Dr. Stuhlmann's book consists in his discriminating descriptions of the numerous tribes with whom he came into contact, and whose supposed migrations he indicates in a small map. Dr. Stuhlmann saw much of the so-called Pygmies. He looks upon them as the remnant of a primeval race, which at one time occupied the whole of tropical Africa and southern Asia. They have lost their original language, and have been encroached upon by surrounding tribes, even within the dense forests to which they retired, until they are met with only in scattered remnants. No trace of degeneracy is to be found among them, for they are well-proportioned and certainly not rachitic.

The author deals fully with economical questions. At present only slaves and ivory reach the coast from the interior, and as ivory is not likely to hold out much longer a substitute for it must be found, unless trade with the interior is to stop altogether. Dr. Stuhlmann recommends a thorough scientific inquiry into the resources of the country, the establishment of experimental agricultural stations, and the breaking-in of African elephants as beasts of burthen.

The maps—by Dr. R. Kiepert—and illustrations which accompany

* See *Proceedings* R.G.S., 1892, p. 540, with map.

this splendid work of travels are excellent. No book would better deserve the honours of a translation.

That distinction has quite recently been gained by Lieut. von Höhnel's account of Count Samuel Teleki's remarkable journey through Masailand,* which culminated in the discovery of lakes Rudolf and Stefanie. Things move so quickly in Africa that an expedition which terminated more than four years ago may almost be looked upon as ancient history. Lieut. von Höhnel's book, however, is new to the majority of English readers; it deals with regions which, for the most part, have not since been visited, and which, moreover, lie for the greater part within the British sphere. The large maps and numerous illustrations of the original are all given, as also the scientific appendices.

Two works dealing with British East Africa deserve to be placed on record. The first of these is a 'Handbook of British East Africa,' prepared by Capt. H. Foster, R.E., and published for the Intelligence Department of the War Office. The compiler gives a concise account of the physical and political geography of the country, its ethnology, products, and trade, and supplies, in addition to this, a good deal of information likely to be of use to travellers. There are a few useful maps.

The second work † was undertaken at the express desire of the late Sir William Mackinnon (whose portrait forms a welcome frontispiece), and presents us with a carefully compiled history of the formation and the work of the Imperial British East Africa Company. The author, Mr. McDermott, is assistant secretary of the company, and must naturally be assumed to have written from the point of view of his directors. We are bound to state, however, that Mr. McDermott has done his best to show no bias, and that if occasionally he does indulge in strong condemnatory language—as in the case of Dr. Peters's expedition—he does so not without good cause.

The recent history and downfall of the empire founded in the Katanga copper country by Msidi, an adventurer from Ugalaganza, may profitably be studied in Mr. Moloney's popular account of the expedition led by the late Captain Stairs,‡ and in Mr. Arnot's 'Bihe and Garenganze.'§ Mr. Arnot, as might be expected, devotes much space to the history of the mission of which he is the founder, and which has now stations in Bihe, at Nana Kandundu's on the upper Zambezi, and in Msidi's old empire. Incidentally, however, we are furnished with much geographical and ethnographical information, and more

* 'Discovery of Lakes Rudolf and Stefanie,' by Lieut. L. von Höhnel, translated by Nancy Bell. London (Longmans), 1894.

† 'British East Africa or Ibea,' by P. L. McDermott. London (Chapman and Hall), 1893.

‡ 'With Captain Stairs to Katanga.' London (Sampson Low), 1893.

§ 'Bihe and Garenganze,' by F. S. Arnot. London (Hawkins), 1893.

especially on the route which connects Benguela with Katanga Land. Mr. Swan, who took the Congo route during his recent visit to Europe, is decidedly of opinion that the Benguela road deserves the preference, as "it costs nearly as much to take a load from the coast to Stanley Pool, as from Benguela to Garenganze.* Even were the railway finished, it would not be worth our while to attempt to reach Garenganze this way."

M. Dybowski's narrative carries us into another section of the Congo state. The author was charged with ascertaining the fate of Crampel's expedition, and to punish the evil-doers. In this he succeeded. Starting from Loango, he crossed to Stanley Pool; then ascended the Congo and the Ubangi to Bembe, and finally pushed northward through a country rendered difficult through heavy rains until he reached the upper Shari, when want of provisions compelled him to retrace his steps. The interest of his narrative centres in his account of the tribes whom he encountered when passing from the French into what may appropriately be called the "Mohammedan sphere." He sharply urges the "organization" of the peaceable and industrious heathen tribes, so as to enable them to successfully resist the raiding-parties who enter their country from the north in search of slaves and ivory.

M. Dybowski mentions various products of the Congo basin, which might be exported if the facilities for transportation were greater than they are at present. It is obvious that ivory cannot last for ever. An examination like that carried on by M. F. Martin during a recent journey up to Stanley Falls should therefore be welcomed. Mr. Martin, an experienced Sumatra tobacco-planter, undertook his expedition on behalf of a Belgian syndicate. He reports that between Bolobo and Bangala there is land sufficient for growing tobacco of a superior quality, but that no financial success can be looked for until the difficulties of transportation, of native labour, and of a supply of food for the labourers shall have been overcome.†

The ethnography of the tribes—Danakil, Somal, and Galla—who occupy the eastern horn of Africa, is dealt with in an exhaustive manner by Dr. Paulitschke, of whose work the first volume has recently been published.‡ The author's description is based upon personal observations during a visit to Harar, and a thorough study of all existing sources of information. In the volume now before us, he deals with the physical geography of the country, the geographical distribution of the tribes, and their migrations, and their "material culture." There are 25 plates of excellent illustrations, and a large ethnographical map.

* 'La Route du Tchad,' par J. Dybowski. Paris (Firmin Didot), 1893.

† 'Afrikanische Reiseskizzen,' von Fried. Martin. Munich (Lindauer), 1894.

‡ 'Ethnographie Nordost-Afrikas. Die materielle Cultur der Danakil, Galla, und Somal,' von P. Paulitschke. Berlin (Reimer), 1893.

A second volume will deal with the "mental culture" of these interesting Hamitic tribes.

The interest of Mr. Bent's book on Abyssinia is archæological and historical rather than geographical. Accompanied by his adventurous wife, Mr. Bent in the course of four months succeeded in taking impressions from a number of highly interesting Himyanitic and Ethiopian inscriptions.* More it was impossible to do, owing to the disturbed state of the country, which necessitated a precipitous retreat. At Axum Mr. Bent succeeded in obtaining perfect squeezes of four inscriptions previously only imperfectly known to us through Salt, Rüppell, and d'Abbadie; at Yeha, a site of ruins to the north-east of Adowa, he obtained small Sabæan inscriptions, dating back, according to Professor D. H. Müller, to the seventh or eighth century before Christ, and proving the place to have been known as Awa; and on the Kohaito Plateau, to the south of Halai, he examined the ruins of what he supposes to have been the ancient Koloe. He very plausibly suggests that a huge reservoir at that place represents Ptolemy's lake Coloe, which is usually identified with lake Tsana.

THE SPELLING OF EGYPTIAN NAMES.†

By LIEUT.-COLONEL J. C. DALTON, R.A.

We have received a copy of the rules, as above, which have been prepared in the War Office at Cairo, and issued to the Egyptian army in the form of a pamphlet, which is prefaced by a memorandum dated March 1, 1894, and signed by Colonel H. M. L. Rundle, R.A., Adjutant-General. This memorandum states that, "in order to reduce the confusion existing with regard to the transliteration into English of native names of places and persons, and to ensure an uniform system of orthography in the various sections of the ministry of war, the following rules and a tentative index have been drawn out. These rules will be taken into use and carefully adhered to in all official documents, orders, maps, reports, etc., from this date."

We must congratulate the Egyptian War Office, and all those who recognize and advocate the necessity of having a uniform system for the orthography of native names, upon the important step thus taken in Egypt. There is no doubt that much confusion has existed owing to the diversity, or rather the absence, of systems for spelling native names which has hitherto obtained in that country, due mainly to the fact that until comparatively recently there has been a jumble of

* 'The Sacred City of the Ethiopians,' by J. T. Bent. London (Longmans), 1893.

† 'Rules of Orthography for Native Names of Persons and Places.' Cairo War Office Printing Press, 1894.

French, English, and other spelling which was most perplexing and undesirable.

It is very satisfactory to the Royal Geographical Society to find that the compiler of the rules just adopted in Egypt has accepted, practically in their entirety, the system initiated by that Society so far back as 1878, and elaborated in 1885. This system has for several years been in use by the Hydrographic Department of the Admiralty in their charts, etc., and by the Intelligence Division of the British War Office in all their maps, and no doubt this fact has served to familiarize the Egyptian nation, and the army in particular, with the system of orthography which has now been made law.

The very few points of difference between the rules we are now reviewing and those from which they are taken are trifling, and chiefly consist in the elimination from the latter of certain letters and sounds which do not exist in the Arabic language, such as the *c* and the *ch*. But the Egyptian rules also omit the *sh*, and this we cannot account for, as the sound is so common in Arabic. We notice also a few of what are probably only printer's errors, such as the remarks with reference to the letters *J* and *K*. As regards the former we presume that for *ds* we should read *dj*, as the latter is a rendering of *j*, which is not unfrequently met with on maps, e.g. *Djebel* instead of *Jebel*. Under K, the Egyptian rule lays down that the English *k* should *never* be put for the hard *c*. Probably the word *never* should here be read as *always*. The examples to the different rules have very wisely been culled mainly from local names; they are carefully chosen, and serve their purpose admirably.

But what is perhaps the most valuable part of the pamphlet is the tentative index, which contains a large number of Egyptian names, given in the Arabic character with their English transliteration. Nothing could have been devised which could better prove the utility and value of the rules than this index, and in Col. Rundle's memorandum he directs that "any queries as to the correct transliteration of words not included in the tentative index should be addressed to the Director of Military Intelligence." By this means an authoritative transliteration of all Egyptian native names will henceforth be laid down, and no other fancy rendering will be considered official.

When we add that the Director of Military Intelligence is Major F. R. Wingate, D.S.O., R.A., who is not only an accomplished Arabic scholar, but an author of no mean repute and a recognized authority on Egyptian matters, we feel sure that the difficult task of making a liberal and at the same time a simple transliteration of Egyptian names could not have been entrusted into better hands.

What seems to us a most important feature of the case is that the compiler of the rules which have been adopted for Egypt has not allowed himself to be led away by the temptation to further elaborate

them, so as to meet the special conditions of the language immediately concerned to a greater extent than can be done by a set of rules which are made for *general utility*. We are quite aware that there are certain sounds which, to the perfectly trained ear of the Arabic scholar, cannot be rendered in an altogether satisfactory way by any system which is intended to apply to more than one language. But if every linguistic expert were to insist upon a system which would meet his particular case only, uniformity and simplicity would go to the wall, and confusion would be worse confounded.

As is well known, the United States Government have adopted the rules as drawn up by the Royal Geographical Society, and have made them law, and if other countries which have to deal with native names (and amongst these the British Colonies occupy a prominent position) will only tackle this knotty problem in as frank and liberal a spirit as the U.S.A. and Egypt have done, those who have at heart a uniform system of orthography for such names may well cherish the hope that they are at last beginning to see light where all not so long since was very dark.

A DECADE OF PROGRESS IN INDIA.*

By C. E. D. BLACK.

It was a happy idea which led the President, as far back as 1872, to remodel the statutory annual statement exhibiting the moral and material progress of India. Up to that date the reports had consisted of little beyond a brief and too often a bare record of the year's work. But Mr. Markham recognized the fact that for English readers some previous history of the various branches of Indian administration was required, to say nothing of the glaring need of literary research and skill in the utilization of materials. The result was a Blue Book which for general interest and importance was altogether a new departure in official literature. The India Office, recognizing in like measure the advantage of issuing at intervals statements of this character, embracing a rather wider field of treatment, took the opportunity in 1883, ten years after the appearance of Mr. Markham's report, to commission Mr. J. S. Cotton to prepare a similar statement for the preceding decade. The present volume, which is the third of the decennial series, is from the pen of Mr. J. A. Baines, C.S.I., of the Bombay Civil Service, whose interesting monograph on the Census of India was lately reviewed in our columns.

The author has done justice to the varied and extended scope of his present work. He has followed the general lines of Mr. Cotton's report,

* The Third Decennial Report, exhibiting the moral and material progress and condition of India during 1891-92 and the nine preceding years. Eyre and Spottiswoode, 1894.

but has added chapters on the Army and Indian Marine, Vital Statistics, Sanitation, and Surveys, while a concluding summary is given of the factors involved in the general condition of the masses and their relative development and importance at the present day. These additional sections, all of which are essential in so many-sided a review of an empire's progress, will give an idea of the care with which Mr. Baines has endeavoured to supply the deficiencies of the preceding volume. On the other hand, the excellent series of statistical and general maps, prepared by Mr. Trelawney Saunders to accompany Mr. Cotton's statement, is conspicuous by its absence. The present Decennial Statement, like the recent Census Report, has no maps at all—an omission which certainly impairs the value of both works for reference. Considering the exceptional facilities for turning out maps of every description and scale possessed by the Surveyor-General's Department at Calcutta, the lack of these valuable media of illustration and instruction suggests more than a passing remark. The author's geographical review of the Indian Empire and its numerous scattered dependencies is, however, all that could be wished. Here Mr. Baines supplies a lucid and concise account of the history and chief characteristics of each province in turn—an account which will form a useful standard work for future reference. The descriptions of Aden, the Persian Gulf, Baghdad, the Somali protectorate, etc., and the exact nature of their relations to the Indian Empire, are also clear and interesting, and considering the process of expansion here visible and the rapidity with which these outlying localities are coming to the forefront of everyday politics, this section is specially valuable. From an economic point of view, most attention will be probably concentrated on the concluding chapter. We cannot afford space to record here even the principal conclusions arrived at respecting the general condition of the multifarious races of India, but some salient points may be noticed. The author does not deny the existence of "habitually starving millions," but, taking the country as a whole, there is plenty of food for all its inhabitants, though hitherto the difficulty of supplying the deficiencies of one locality with the surplus of others has been only partially overcome. Fortunately, the old days when grain was selling at famine prices in one district, and actually rotting on the ground in another, are gone. Registered meteorological observations indicate that, as a rule, two-thirds of India are affected each year, either favourably or prejudicially, in a manner different from the other third. There is no record of a universal failure of crops, any more than of a general harvest above the average. With regard to the land and its burthens, the Government assessment is known to be light throughout India, but it would have been interesting had the author made some effort to show how Indian taxation compares with that of other countries. But the indirect evidences of the progressive prosperity of

the people are too clear to be mistaken, and Mr. Baines deserves credit for the convincing manner in which he has marshalled his array of statistical facts pointing to this vital conclusion. We wish that he had supplied more liberal references so as to enable readers to look up the actual sources of information on which his most interesting volume is based.

JOURNEYS IN MONTENEGRO.*

By Dr. KURT HASSERT.

In 1891 and 1892 Dr. Kurt Hassert made two journeys in Montenegro of five and three months' duration respectively. To travel through the Black Mountains of Montenegro can hardly be regarded as a pleasure trip, as the roads are in a very bad condition, and not seldom absolutely unfit for travelling with beasts of burden. Comfort is, therefore, in many cases altogether excluded; for weeks the clothing cannot be changed, and the traveller is obliged to spend the nights without a bed and exposed to the tortures of innumerable insects. Food is of the most primitive kind. Coarse maize-bread, potatoes, honey, cheese, and milk are the principal food-stuffs; fish and meat (mostly mutton) and poultry are but rarely obtainable. The Montenegrins are very hospitable people, who share whatever they have got with the stranger; but, owing to their extreme poverty, they expect a money present in return. Life and property are quite safe in Montenegro, with the exception of the Albanian frontier and the Turkish territory, which are rendered unsafe by Arnaut robbers, who frequently lie in ambuscade and treacherously shoot down their victims.

The Black Mountains form part of the Dinaric Alps, the gigantic walls of which, crowned by steep crests, slope very abruptly to the Adriatic. East of these districts the mountain ranges are followed by a plateau which slopes down to the lake of Scutari, and is divided into two parts by the broad Zeta valley and the Duga passes. The highest point of this plain has an elevation of not more than 260 feet above sea-level. Its soil is very fertile, and capable of unlimited cultivation. This district is of importance, as the shortest and most convenient route from Albania to the Herzegovina. Strategically, it is the weakest point of the principality. It was used in 1862 by Omar Pasha as a basis for his operations, and if the Turks had at that time constructed a fortified road, Montenegro would have been divided into two parts, and its independence made very questionable, as the western districts of the country are infertile tracts of land. A similar plan of campaign was adopted by the Turks in the war of 1876 to 1878, viz. by advancing from north and south to concentrate their forces in the Zeta valley. The alleged invincibility of the Montenegrins is therefore unsupported by facts. Their individual bravery is acknowledged by everybody, but their independence is chiefly due to the inaccessible and desert mountain ranges of western Montenegro, which render it impossible for an invading force to remain there long enough to subjugate the country.

The physical features of the two parts of the principality differ considerably, from one another. The western portion consists of the Crna Gora proper. The other division, which is called Brda, consists, in its eastern parts, of a slate forma-

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* Paper read at the Berlin Geographical Society, February 2, 1894.

tion, the mountains forming pronounced and well-developed chains and ranges; it has extensive primeval forests, rivers of considerable importance, and large tracts of land which are characterized by the loveliness of their scenery. With the exception of the fertile plains near the Lake of Scutari, the western parts of Montenegro present totally different physical features. Their surface consists of a monotonous limestone plateau almost without water and vegetation, and occasionally exhibiting the very worst Karst features. Speaking from a general geographical point of view, the country has to be divided into three parts, distinguished from one another by their different physical features, viz. the Karst mountains, the slate formation, and the plains together with the coast belt.

The traveller who quickly passes through the country may find the Karst picturesque and very interesting. But the eye soon gets tired of the monotonous and desert mountains, where the oppressive heat of the day is followed by the coldness of the night, and where hardly any water is found, the possession of the few existing wells and springs—which are famous in the poetry of the surrounding tribes—being the cause of much dispute and bloodshed. The Nikvsic basin (of only 19 square miles' area) is the only spot where water is plentiful. The courses of almost all rivers which flow into it are partly subterranean. They finally join the Zeta, but also this river disappears in an underground gorge, coming again to the surface on the opposite side of a broad mountain, whence the river—which is now of considerable size—continues to flow at the surface. Besides the half-burnt grass, which only in springtime grows somewhat more abundantly, the Karst is characterized by a vegetation of low bushes, the mountains being but rarely studded with single trees. In former times the Karst mountains were covered with beautiful forests of beeches and conifers, which have, however, almost entirely disappeared. Near the frontier the Turks felled the trees in order to protect themselves against the attacks of their troublesome neighbours, and the Montenegrins themselves destroyed the forests in the most senseless way, and rainfall and wind completed the work of destruction by carrying off the loose humus. Thus these once fertile territories were transformed into the dreary desert of to-day. Not more than 200 years ago the Sinyavina Planina was covered with large forests, and had numerous permanent settlements. At the present day it is a desert without any forests and inhabitants. Its large plains are almost without grass and bushes, and can only be used as poor pastures during the spring months. Thus the Karst of to-day must be described as a stony and inhospitable desert, the oases of which are represented by a number of basins and valleys which are mostly fertile and well cultivated. But besides these features, some of the mountains and valleys of the Karst are not without grand and picturesque scenery. These are, however, almost entirely unknown, owing to the fact that they are situated in a country which belongs to the wildest regions of Europe, and which is avoided by travellers on account of its alleged insecurity. Cañons like those of the Colorado are met with, being great obstacles to the progress of civilization, but at the same time forming good natural boundaries, like the gorge of the Lower Tara between Montenegro and the Sanjak Novi Bazar.

It is unintelligible why the Berlin Congress did not select the gorge of Ciyevna, which is not less than 3900 feet deep, as the boundary between the Montenegrins and their deadly enemies, the Albanians—a mistake the consequences of which are incessant feuds at the frontier, which runs about a mile to the west of the river. Also the most recent Albanian riots, of 1893, were due to this fact. The traveller feels relieved when, after having passed these districts, he enters East Montenegro. Instead of the monotonous triassic and cretaceous limestones, sandstone rocks and mica schists make their appearance, frequently interrupted by diabasic rocks. The lovely mountains and valleys are covered with humus, water is plentiful, and a

luxuriant grass vegetation, as well as vastly extending forests of beeches, oaks, and conifers, characterize the country. Numerous farms and dairies are met with on the plateaux, and villages are frequent in the valleys, where the climate is mild. Only the highest summits of the steep mountains are devoid of vegetation, thus adding to the loveliness of the lower ranges the wild grandeur of a high and bold mountain region. These territories, which until quite recently were almost unknown to geographers, are inhabited by a healthy and robust race. The plains round the Lake of Scutari and the coast belt bear witness to the activity of the population. The districts surrounding this lake are the most fertile parts of Montenegro, producing cereals in large quantities. It is, however, a great drawback that, owing to the yearly inundations, the flat eastern banks of the lake are covered with swamps and morasses, which make the district very unhealthy, producing malignant fevers. The lake, which is the largest of the Balkan peninsula, covers an area of 135 square miles, and is one of the most picturesque lakes of Europe. It abounds with fish. Immediately on its western termination rise the coast mountains of Rumiya, and its eastern portion is bounded by an extensive plain. This latter part of the lake is so shallow that its maximum depth, according to Dr. Hassert, is not more than 23 feet. It is evident that the lake owes its existence to permanent inundations of the lowest portion of the plain. The narrow outflow of the lake, the Boyana, is partially obstructed, and the consequence is that the lake gradually becomes deeper and larger, and fertile tracts of land and villages which existed but a few centuries ago are now covered by the lake. Not less than three times the rising floods rendered it necessary to change the site of the town of Scutari, either in part or completely; and when the level of the lake is at its highest, the depth of the water near the bazaar of the town is not less than 10 feet. A correction of the Boyana river would render this impossible, and at the same time open the lake to European commerce. But, unfortunately, most of the wishes and hopes which the traveller may have with regard to the development of the country seem to have a very remote chance. The country round the lake is densely peopled, the fields yield two crops per annum, and fine old olive groves surround the towns of Scutari, Antivari, and Dulcigno. The most important districts of the principality are connected by a number of good waggon-roads, and the nine post-offices which Montenegro possesses are connected by telegraph with one another.

THE HYDROGRAPHY OF THE ÆGEAN AND THE DARDANELLES.

THE fourth and last expedition of the Austro-Hungarian ship *Pola*, during the summer of 1893, was chiefly occupied with researches in the Ægean Sea. Professor J. Luksch, of Fiume, to whom the charge of the hydrographical work was entrusted, has published a preliminary report, and we are indebted to our correspondent, Dr. Peucker, for the following summary of his results.

Further soundings confirm the result that the basin of the Ægean is comparatively shallow, the greatest depth not exceeding 1230 fathoms. Between the islands separating it from the Mediterranean basin, the depth is extremely uniform, but even in the deepest channel—between Crete and Caxo further to the east—it does not attain 440 fathoms, and the two basins may therefore be regarded as entirely separate. In the Ægean basin a series of more or less extensive submarine valleys, separated from each other by islands or submerged barriers, form a striking feature; the deepest of these, starting to the north of the eastern extremity of

Crete, includes the sounding of 1230 fathoms already mentioned, the exact position of which is 35° 36′ 30″ N. lat., 26° 15′ 40″ E. long. This valley extends westward and gives a depth of 710 fathoms east of the island of Cerigo. Another depression farther to the north gives a maximum depth of less than 550 fathoms. The broad region northwards and eastwards of this and between the coast of Asia Minor and the Cyclades is almost everywhere shallow (maximum 417 fathoms), while the most northerly part of the Ægean sinks again to 710 fathoms, being deepest on the western side. The complexity of the physical features of these parts demanded more frequent soundings than were necessary in the Mediterranean—observations being required at intervals of 10 to 20 miles, instead of 30 to 60 miles. In addition to these, a new sounding of 2114 fathoms in the Karaman Sea east of Rhodes may be noticed, as affording, along with others in its neighbourhood, a completed view of the relief of the Levant. It seems in the highest degree unlikely that greater depths will be discovered in this region, and the longer axis of the depressed area is shown to run in a north-west to south-east direction from Rhodes to the mouth of the Nile. As appears from a tracing of a chart given in the report, the line of 3000 metres (1640 fathoms) encloses an area only 60 miles long and 40 miles broad.

Professor Luksch's observations of temperature and salinity lead him to the general result that the warmth of the intermediate layers of water diminishes from south to north, as also does the salinity. The highest temperature, associated with the greatest salinity, was met with off the south-west coast of Asia Minor, where the water retained all the characteristics of the Mediterranean. From Samos northward to the Dardanelles, there was marked cooling of the water and lowering of salinity, but in the extreme north temperature again increased somewhat; and on the Greek coast similar variations occurred. In the intermediate region between the two coasts rather lower temperatures were observed than in the south-eastern and south-western corners of the sea. Special attention was directed to the study of the currents in the extremely irregular channel joining the Ægean with the Black Sea, and although observations were for the most part made by indirect methods, Professor Luksch is of opinion that sufficient material has been collected for the construction of a reliable current-chart of the Ægean. Direct measurements were possible only in the Dardanelles, and there the results of Captain Wharton's researches on the current from the Black Sea—the existence of which has been known since 1681—were confirmed. Near mid-channel the speed of the current was found to vary from $1\frac{1}{2}$ to $3\frac{3}{4}$ miles an hour, chiefly under the influence of wind. The rapid decrease of speed below the surface, found by Wharton, was not, however, again recognized. Wharton's observations showed that a surface velocity of 3 miles an hour was reduced to half a mile an hour at a depth of 5 fathoms, and Luksch obtained practically the same speeds at the surface and at $5\frac{1}{2}$ fathoms. The temperature of the water in the Dardanelles was found to increase slightly from the south end towards the middle, the salinity at the same time diminishing; but the water was fresher than in any part of the whole Mediterranean region, corresponding more to the waters of the Baltic off the coast of Schleswig.

The transparency of the waters of the Ægean—in relation to intensity of sunlight, sea disturbance, etc.—was investigated by means of photographic plates and white metal discs. With a ten minutes' exposure the former were acted upon at a maximum depth of 330 fathoms, and the latter remained visible when 27 fathoms below the surface; these observations were made off the south-west coast of Morea. The transparency is not so great as in the Mediterranean, where the discs were sometimes seen nearly 30 fathoms below the surface. Experiments showed that the effect of cloud or thin fog in diminishing transparency was much less than that of a slight sea disturbance, especially when short and broken and not

of the nature of a swell. The colour of the sea-surface was for the most part intense blue, two or three per cent. of yellow, according to Forel's scale; only in the northern part near Mount Athos and in the Dardanelles did the scale-proportion of yellow rise above five per cent.

THE MONTHLY RECORD.

EUROPE.

Scylla and Charybdis.—Amongst the many natural phenomena which have in these days lost much of their terror, but little of their charm of historical interest, are the famous tidal whirlpools at the entrance to the Strait of Messina. Recent revisions of the Italian charts finally prove them to be insignificant, although doubtless at certain seasons they were a source of real danger to the small ships of ancient times. The currents of the Strait of Messina, however, offer many curious peculiarities, and the "remarks" appended to the chart just mentioned (No. 47, May, 1892; notes translated in *Annalen der Hydrographie*, 1893, p. 505) illustrate some anomalies in the behaviour of tidal streams in a manner likely to throw light on many cases where the conditions are more complex. The latest surveys have cleared up a number of doubtful points not settled at the time of publication of the 'Mediterranean Pilot,' and corrected some errors in the work of the German surveyor, Keller. In a recent number of *Globus* (Bd. lxv., No. 11, p. 176), Dr. Gerhard Schott gives an excellent summary of present knowledge of this subject, with charts showing the surface circulation during ebb and flood tides. The cause of the relatively strong current—which attains a maximum speed of 5½ miles an hour—is almost solely the configuration of the coast-line and of the sea-bottom. High water occurs in the Ionian Sea at the time of low water in the Tyrrhenian, and conversely, but with the feeble tides of the Mediterranean the maximum range at Messina does not exceed 10½ inches to 1 foot. The flood stream, which runs northwards through the strait, begins in the upper and narrower portion about two hours after the moon crosses the meridian of Faro, at Messina two hours later, and two hours later still it is running through the whole channel. The ebb current, entering the narrow opening between Scylla and Punta Peloro, tends to cross and recross from side to side of the strait, at least as far down as Reggio. Where the irregularities of the coast-line form a bay sweeping back from the main channel—as between Faro and Messina on the Sicilian side, and Catona and Reggio on the Calabrian—back currents, locally termed *Bastardi*, are found, extending from the shore outwards for over half a mile. These currents always run in the opposite direction to the tidal streams, and are obviously extremely useful to navigators; they show very clearly on a small scale the influence of certain forms of coast-line upon the arrangement of tidal currents, an effect very often so disguised as to be scarcely recognizable, as for example in the English Channel. The whirlpools of Scylla and Charybdis are probably whirls set up at the interfaces between the *Bastardi* and the tidal streams. But, unlike the Corryvreckan, they are by no means easy to locate.

The Lake of Zell in Salzburg.—A bathymetrical survey of this lake was carried out in 1892 by Dr. W. Schjerning, whose report has lately appeared (*Zeitschrift Berlin Geogr. Soc.*, 1893, No. 3). The lake occurs in the central of the three depressions by which the chain of the Salzburg Alps is broken, which, unlike those to the east and west (traversed by the Salzach and Saalach), is drained in opposite directions, though with a very slight parting ridge, the lake occurring on

the southern slope, and discharging to the Salzach. The slope, however, is so slight that, until artificially regulated, the water of the Salzach at times flowed back into the lake and even threatened to surmount the water-parting towards the Saalach. The lake, which is roughly 2¼ miles long by 1 broad at its widest part, is contracted at the centre by the deltas of the principal feeders, which enter at the sides, though the main contours are still unaffected. The shores are flat at the ends, but descend steeply at the sides. The deepest part is nearly central, and reaches 228 feet, less than previously supposed, but a considerable depth when regard is paid to the flat nature of the valley north and south. Tables are given showing the percentage of area occupied by the successive zones of depth, the angle of slope at each stage, etc. The mean depth is calculated at 121 feet. A connection probably exists between the formation of the lake and that of the defile of the Salzach to the east, which seems quite recent. According to a theory of Brückner's, the ancient Salzach glacier flowed through the opening at Zell to the Saalach, but sent an arm eastwards which excavated the defile just mentioned. At the melting of the glacier, the former course being blocked by the end moraine, the Salzach made use of the new channel, its lateral deposits damming back the lake at its southern end.

Early Nomenclature of the Bernese Alps.—The history of the nomenclature of the Bernese Alps is the subject of a paper in the *Jahrbuch* of the Swiss Alpine Club, by A. Wäber, who traces the progress made in fixing the names of the various summits down to the end of last century. The process was slow and gradual, especially with regard to the central snowy peaks. Maps were wanting, and the inhabitants as a rule troubled themselves little about parts of the chain beyond the limits of pasturage. Many of the names of "Alps," or pasturing grounds, however, became attributed also to the peaks which dominated them. The nomenclature of the earliest maps (at the end of the fifteenth century) was extremely scanty. The first to add much to it were Schöpf (1577–8) and Rebmann (1592–1604). Then after a century's standstill it was again enriched by the works of Scheuchzer (1712–16) and Bodmer (1701–10), and fifty years later by the publication of the "Eisgelbirge" of Gruner, which contains a vast amount of material, though without very much sifting. The interest aroused in the Alps at the end of last century brought about a further increase of knowledge, towards which Studer in particular contributed by his series of panoramas. It was, of course, long before the nomenclature became definitely established, and, strange to say, the uncertainty lasted longest in the case of the finest group, that of the Jungfrau, Mönch, and Eiger, although the first and last names had been applied as at present by Schöpf (1577), who surpassed many of his successors in exactitude. The Mönch, which was first so called by Studer in 1790, had often gone by the names "Inner Eiger," "Eigers Scheeberg," etc. A table is given showing the dates at which the present names of the principal summits were first applied. The Wetterhorn is among those already named by Schöpf.

The Geography of Norway.—At the last meeting of the Norwegian Geographical Society, Dr. Hans Reusch, the well-known geologist, read an important paper on "A New Feature in the Geography of Norway." The sloping of the entire country towards the coast, said Dr. Reusch, does not continue right out to sea, but spreads outwards along the low-lying, almost level part, for which he proposed the general name of "the strand-flat." Those who have visited Bergen will have noticed the lowland on which the town stands, and which surrounds it. The lowland flats of the Karm and Bömmel Islands will also be remembered by voyagers along the coast. All this forms part of the "strand-flat." This flat was, it must be assumed, formed in earlier geological times by the level of the sea being higher than at present. The corroding forces destroyed the land

down to the "flat." This "strand-flat" is an uneven one, and, by its being partly washed by the sea, the enormously long Skjeergaard or chain of skerries along the coast has been formed. On the "strand-flat" are situated the towns of Stavanger, Bergen, Tromsö, etc., and hundreds of thousands dwell upon it. It must, therefore, be considered an important feature in the geography of Norway.

ASIA.

The Syr Daria.—Mr. Sven Hedin, the Swedish traveller at present exploring in Central Asia, has sent the result of his observations on the Syr Daria to the Berlin Geographical Society (see *Verhandlungen*, vol. xxi. p. 150). The ancient Jaxartes is now called the Syr Daria from the point, 1150 miles from Lake Aral, where it is formed by the union of the Narin and the Kara Daria. The Narin rises in the mountains south of Lake Issik-kul (at 12,000 feet), and flows down the steep valley at the north of the Tian Shan, passes through a narrow gorge at Fort Narin (7100), and 200 miles below it turns from a westerly to a south-westerly direction, and changes its slope from 21 to 17 feet per mile. Middendorff called it a dirty, troubled, chocolate-coloured stream; but at the beginning of February Sven Hedin saw a clear, light-green stream, carrying plenty of drift ice. Just before the junction of the Narin and the Kara the former was over 167 feet broad, 6 feet deep, and flowed with a surface speed of 3½ feet per second; while the latter was nearly 260 feet broad, about 5 feet deep, and had a speed of practically 4 feet per second. So at that season the Kara, with nearly 4700 cubic feet per second, has a greater volume than the Narin, with about 3100 cubic feet per second. This probably happens for one or two months, when the more northerly Narin, with a northern exposure, is frozen; and the Kara, which comes down its steeper slope (21 feet per mile for the last 90 miles) from the southern slopes of the Ferghana mountains, is fed by melted snow. Its colour was a dirty grey, and its temperature on February 2 was 38° Fahr., whereas that of the Narin was only 32·2°. Later in the season the Narin probably has the same dirty colour, and becomes the larger stream. It is said to rise from 10 to 12 feet in five days, and to sink just as rapidly. About 4 miles below the junction the waters of the Kara have not quite mixed with those of the Narin, for a clear current 50 feet wide, with a temperature of 34° Fahr., was found near the right bank, and at the left bank (590 feet from right) the temperature was 36·1°; the drift ice, however, floated down the middle of the stream. At the ferry on the road between Khokand and Chust, about 55 miles further down, the width of the river is 640 feet, its depth 5 feet 3 inches, its speed 2½ feet per second, and the volume 7840 cubic feet per second, almost the same as the sum of those of the Narin and the Kara. The colour was dirty grey, the temperature 35·4°, and all the ice had melted; so the Kara water prevails, as the air-temperature at this season was below 32°. At Khojend (108 miles down) the river was clear, and carried drift ice, and had cooled to 32·9°. Its breadth here was 430 feet, depth nearly 13 feet, speed 2½ feet per second, and volume nearly 12,900 cubic feet per second, while Petraff gives the minimum volume between 9900 and 12,850. The mark for summer depth on the bridge at Khojend was 14¾ feet above the water-level on January 27, 1894. The fall of the Syr was in some places as much as 3 feet per mile, but after passing through a gorge near Khojend, it descends only between 8 and 9 inches per mile for the remaining 990 miles to Lake Aral. At Kasalinsk on November 28, 1893, Sven Hedin found the Syr Daria grey-yellow, 1066 feet broad, 8 feet deep, moving 2½ feet per second, which gives a volume of nearly 20,000 cubic feet per second, provided the mean surface speed is assumed to equal average speed of the river. In spring and summer the river is undoubtedly larger in the upper reaches. Much water is used for irrigation purposes, especially for the

rich rice-fields, so that the Syr Daria has been called the Nile of Turkistan. The river also overflows its banks, wide marshes occurring between Khokand and Margilan, and in the lower part of the course temporary morasses and lagoons are very common on the right bank, especially between Kasalinsk and the mouth and east of Perovsk, where the reedy Bokali Kopa is an area of nearly 2000 square miles under water. Much water sinks into the sands in summer, and much is evaporated, so that the volume reaching Lake Aral at that season is probably no greater than in winter. The river never freezes between Ferghana and Khojend, but below that it has usually a solid ice sheet for over a month at Chinas, for nearly three months at Perovsk, and at Kasalinsk, from the mean of twenty years' observation, it is frozen from December 4 to April 4 each year. Romanovitch has made tables giving dates of freezing and thawing on the Syr Daria and the Amu Daria, and shows that the line of similar dates of freezing runs north-east south-west, whereas that for thawing runs east and west.

Events in Baluchistan.—From the report of the Baluchistan Agency for 1892–3, we learn that the British occupation of Mekran has been withdrawn. With regard to surveys, 3789 square miles on the half-inch scale in the Las Beyla country, and 820 square miles in the Gorral and Zhob valleys, were completed last year; a cadastral settlement survey is in progress in Queltar and Pishin, and a native surveyor is at work reconnoitring north and north-west of Kharan, and with the object of finally leaving no unsurveyed country between the Mekran coast and the Helmund river.

South-East Borneo.—Compared with the other Dutch possessions in the Eastern Archipelago, Borneo has hitherto remained very much in the background, and is still to a great extent a *terra incognita*. An account of the south-east residency, contributed to *Petermann's Mitteilungen* (1894, p. 27) by mining engineer G. Schneiders, is therefore welcome as a summary of the present economic condition of the country, and its prospects of future development. The most important feature in this part of Borneo is the river Barito, the largest in the whole island, and, like other rivers of tropical islands, possessing a volume out of all proportion to its length, which, however, amounts to over 500 miles. It forms the best highway into the interior, which is commanded by the town of Banjermasin, the capital of the residency, though this does not, as sometimes supposed, lie immediately on the main stream, but a short distance up its tributary, the Martapura. The whole neighbourhood is a swampy level, in great part covered at high tide, which necessitates the artificial raising of the streets, and the building of the houses on piles. This situation affords security against attack, while the constant washing away of impurities renders it comparatively healthy. Out of a total population of 25,000, the foreign section includes 1600 Chinese, 300 Arabs, and 200 Europeans, the last, however, including those with a mixture of Malay blood. Germans are comparatively numerous, but are apt to lose their distinctive nationality. On the lower Barito, the pile-built huts of Malay fishermen at wide intervals are almost the only signs of habitation, but on its tributary the Negara matters improve, and here accordingly Dutch enterprise is mainly concentrated. A military road from Banjermasin joins the principal posts in this direction. The range of hills which bounds the basin of the Barito eastwards, and runs down to the south-east corner of the island, contains great mineral riches, including gold, platinum, diamonds, etc.; but the regulations, which make it difficult for any but Dutch settlers or other naturalized Europeans to obtain grants of land, are an obstacle to their development, as is also the want of easy access to the coast and the interior. Some German, English, and French miners are, however, at work. Without better communications and properly regulated methods of collection,

gutta-percha, camphor, iron-wood, etc., cannot become paying exports. In spite of the suitability of the soil for rice-cultivation, enough is not always grown for home consumption. Pepper and tobacco receive more attention, and tea and coffee would probably do well. With the present restrictions on the immigration of Chinese, recourse must be had to Japanese or Madurese labourers, the natives showing slight aptitude for work. The stages by which the Dutch extend their influence into the interior, and gradually reduce the native chiefs to the position of feudatories, are traced by the writer, who draws the general conclusion that the island presents few difficulties in the way of colonization.

AFRICA.

The Congo-Portuguese Frontier.—The new frontier between the Congo State and Portuguese territories from the Kwango to the Kasai, the delimitation of which on the spot by a joint commission on the lines of the agreement of May, 1891, was ratified at Brussels in March last, is shown by a map in the *Mouvement géographique*, 1894, No. 8. There are some minor deviations from the provisional line which followed the eighth parallel from the Kwango to the Kwilu, the latter river to the seventh parallel, and this to the Kasai. These are made either to follow the course of streams, or, apparently, to pass to one side or another of important villages. Between the parallels above mentioned, some minor streams serve as the boundary instead of the Kwilu, and thus the abrupt angles of the original line are avoided. As in other recent agreements, it takes no account of existing tribal relations, for while the main part of Lunda west of the Kasai falls to the Portuguese, the northern tributary districts, such as that of Muata Kumbana, visited by a member of Wissmann's expedition in 1884, are assigned to the Congo State. As the boundary on the whole takes much the same direction as the route of that expedition, the surveys of the commission (on which the Rev. G. Grenfell represented the Congo State) did not deal with any great extent of new country, though the rivers Wamba, Kwilu, Loanque, etc., were crossed somewhat further to the north. According to Mr. Grenfell's report, the development of the country will require the *razzias* of the Kioks to be stopped; it may then furnish a good supply of cattle. The details which he gives as to the occurrence of the *Elais* and *Raphia* palms, and the flora and fauna generally, agree with Wissmann's account.

The Lubudi River, South-East Congo Basin.—Details respecting the exploration of this river, one of the chief tributaries of the West Lualaba, by the Belgian expedition, led, after the death of M. Bia, by Lieut. Francqui (cf. *Geographical Journal*, i. p. 449), appear in the *Mouvement géographique*, 1894, No. 8. Several tributaries of the Lubudi were crossed by Cameron, who was not, however, as stated by M. Francqui, the first to mention it, for, as well as the Lufupa, another tributary of the West Lualaba, it appears (under the name Lububuri or Luburi) in the itinerary of the "Pombeiros" (1806). Of late years it was crossed by Mr. Arnot in 1885, and by Le Marinel in 1891. Although much smaller than the Lualaba at the junction, it has possibly, according to Lieut. Francqui, a much longer course; for, having followed the latter river from its source, he has proved that it cannot be the stream crossed by Capello and Ivens in S. lat. 13°, which, however, may very likely be the Lubudi. This stream is wide but shallow, with a rapid current, and receives some important tributaries. Except the islands and immediate banks, the country through which it flows is the usual tree-savannah, and is fairly fertile and well-peopled. On the right bank is the important tribe of the Lubende, who so far have been little touched by foreign influence. Caoutchouc is the only important article of commerce produced in their country. To the west are the Baluba-Lukéla, and above them the Samba, belonging to the Lunda family.

Algiers as a Coaling-Station.—Algiers is rapidly becoming an important coaling-station for vessels going to and returning from the East. Formerly ships used to stop at Gibraltar and Malta, but Algiers has been found a much more convenient stopping-place, as it divides the distance better between Port Said and the United Kingdom, and is free from the unusually strict quarantine regulations frequently enforced at our own Mediterranean ports. Sir Lambert Playfair, our Consul-General, submits a statement in his recent report on Algiers showing that, while in 1886 the number of British vessels that called for coal was only 85, in 1890 the total had risen to 263, and last year to 1118. He adds that the number is increasing every day.

Machin and the Discovery of Madeira.—Mr. Batalha Reis points out to us that "the story of Machin had been rejected long before Brito Rebello by Rodriguez de Azevedo in 1873, 'Saudades de Terra pelo Dr. G. Fruchuoso' (pp. 348–424)." The document referring to Machico was discovered by Brito Rebello, who acted on a hint given him by his friend Ernesto do Canto. Galvão, in the original Portuguese, calls the adventurer Machim, whilst in Hakluyt's version he is called Macham. Of course, the discovery of the document referred to cannot be said to have finally settled this controverted question.

AMERICA.

The Highest Summit in North America.—"It is curious to know," says the Washington Letter in the last *Bulletin* of the American Geographical Society, "that the highest mountains on the continent of North America, so far as is now known, were discovered by browsing around in a table of logarithms." This quaintly worded statement is made with reference to the announcement by Dr. Mendenhall, that the discussion of the horizontal and vertical angles, taken by Mr. McGrath's party in Yakutat Bay and other parts of the neighbourhood of Mount St. Elias, shows that that peak is not the only lofty summit, nor the loftiest on the shores of Alaska. A group of three snow-summits, probably belonging to one mountain, had been observed by several explorers, and Mr. Russell gave them the name of Mount Logan after the founder of the Canadian Geological Survey. It is this mountain which has now been found to be the loftiest of the group, the elevation assigned being 19,500 feet. Mount St. Elias, after undergoing many vicissitudes as to its height, has probably been at last definitely fixed at 18,000 feet; and Mount Orizaba, in Mexico, the only loftier summit hitherto known in North America, probably does not exceed 18,300 feet. The full discussion of this question will be looked forward to with much interest.

Exploration in Northern Bolivia.*—When Mr. Chandless reached his furthest point on the river Aquiry, or Acre, the chief tributary of the Purus, he was at no great distance from the river Madre de Dios, one of the chief tributaries of the Beni. This was in 1865. Mr. Chandless took twenty observations for latitude on the Aquiry, and observed two occultations. His surveys of the Purus and Aquiry are admirable pieces of geographical work. Since his time many india-rubber collectors have penetrated into these wilds, and have established stations. One of these indiarubber workers is a Bolivian named Victor Mercier, who settled on the Madre de Dios, and in 1887 undertook to traverse the previously unknown country between the Madre de Dios and the Aquiry. The journey, chiefly through dense forest, occupied him from the 9th to the 30th of August. He encountered friendly Indians of the Pacahuara and Guarayo tribes, and reported the country to

* *Diario do una expedicion del Madre de Dios al Acre por Victor Mercier, escrito dedicado al Doctor Antonio Quijarro* (*La Paz*, 1894).

be very beautiful, in some places open glades alternating with belts of forest. Some thriving indiarubber stations were found on the banks of the Aquiry. The narrative of this important journey across the unknown country between the Madre de Dios and the Aquiry, made in 1887, was not printed until the present year, when it appeared in a small pamphlet issued at La Paz, in Bolivia, and dedicated to Dr. Antonio Quijarro, himself an explorer of the eastern forests.

Condition of British Honduras.—The following notes on the present condition of British Honduras are taken from Mr. E. B. Sweet Escott's Report on the Blue Book of the Colony for the year 1892 (Colonial Report, Annual, No. 94). According to the census of April, 1891, the population was 31,471, 16,268 males and 15,203 females. The total white population amounted to 400. The estimated area of the colony is 4,839,408 acres, of which only 45,000 acres are returned as being under cultivation. The estimated extent of forest yielding mahogany and logwood is 3,065,000 acres. The principal products of the colony, in addition to mahogany and logwood, are sugar, bananas, rum, Indian corn, coffee, rice, and coconuts. According to observations taken at the station at Belize, which are not well summarized in the Report, the maximum of air-temperature was 90° in June, July, and September, whilst the minimum was 60° in January. January, November, and December were the three coolest months in the year, though the air-temperature (presumably the maximum) recorded was 84°, 86°, and 85° in these months respectively. The average maximum temperature for the twelve months was 87·7°, and the average minimum temperature 67·1°. The total rainfall for the year was 72·64 inches, and rain fell on 119 days. The lowest rainfall was in April, and the greatest rainfall was in October, with a total of 17·72 inches. There are no railways, canals, telegraphs, or telephones in the colony, and the roads so called consist almost entirely of paths cut into the forests. The rivers and sea are now the principal highways of communication.

The North-West of the Argentine Republic.—At the meeting of the *Société de Géographie* of Paris on March 16, Dr. Meyners d'Estrey communicated a short account of a recent expedition sent out by the Argentine Government to study the geography, geology, and archæology of the provinces of Catamarca, Salta, and Tucuman. Dr. Moreno, director of the La Plata museum, was leader, and he was accompanied by Messrs. Lange, Rooco (topography), Hauthal (geology), H. Ten Kate (archæology), and two assistants. The topography and cartography of these regions are still imperfect, as Brakebusch's map, which is probably the best, leaves much to be desired. Mr. Lange is preparing a map of Catamarca from the results of the new expedition. Except on the eastern mountain slopes, part of Tucuman, and the Lerma valley, luxuriant tropical vegetation was not seen, and most of the country is an arid desert, becoming more so the further north-west the explorers penetrated. Formerly the land was probably much more fertile, but, except in a few places where grapes and peaches grew, the cactus replaced the fields of maize, the pueblos were in ruins, and a miserable, lazy, and ignorant population of half-breeds and Indians replaced the old civilized race. Dr. Ten Kate made many excavations in old buildings and cemeteries, and also purchased many objects of archæological interest. The earthenware is of all shapes and sizes, and often richly ornamented. He has also articles in stone, arms, tools, ornaments and fetishes in copper, bone, and shell, as well as numerous skeletons, most of which are in earthenware pots. It appears that the indigenous people, now completely vanished, had workshops, and knew how to manipulate metals, and to weave; they cultivated the soil, and kept great herds of llamas, sheep, and goats.

POLAR REGIONS.

The Norwegians in the Antarctic.—The *Jason* (Captain Larsen), *Hestha*, and *Castor* returned to Port Stanley, Falkland Islands, on March 16 (?) from their second trip to the Graham's Land Seas. They have made a successful sealing voyage, over 16,000 seals being captured. Captain Larsen obtained half the total catch. The weather is reported to have been very cold. Unfortunately, three men have been drowned owing to the capsizing of a boat. The *Antarctic*, of Tonsberg, arrived at Melbourne on February 27. She called at Las Palmas, Tristan D'Achuma, and Kerguelen. At Kerguelen the vessel ran into Greenland Harbour and visited Royal Sound, where a colony of 59 persons was found, consisting of Europeans, Chinese, and Indians; 1600 hare were obtained, but no fur seals. She will visit Newcastle and Sydney, and sail south in November for the Antarctic ice.

AUSTRALASIA AND PACIFIC ISLANDS.

Discoveries of Relics at the Abrolhos Islands.—The secretary of the Hakluyt Society has recently received a letter from Messrs. Broadhurst, Macneil & Co., who have for some years been settled on Houtman's Abrolhos, in which, after referring to the late Mr. R. H. Major's volume on 'Early Voyages to Terra Australis,' published by that Society in 1859, they say, "Latterly, our operations being carried on in the southern part of the group, where the *Batavia* in 1629, and the *Zeewyk* in 1727, were lost, we have found a good many relics. Since the beginning of the year, upwards of sixty coins, beginning with Philip IV. of Spain (1633) and ending with a large silver coin of the city of Utrecht, Holland (1726), have been found on Gun Island. Some gun-locks with 'Zeeland-Cameer' on them, cannon-balls, pistol-bullets, wine-glasses, weights, clay pipes, a large number of rosary beads, and numerous other articles—wine-bottles, etc.—have also been found on the same island." It will be remembered that similar relics were found in 1840 by a party of Englishmen who visited the group, and the Gun Island referred to received its name from one of the articles then recovered.

German New Guinea.—Additions continue to be made by the officers of the German New Guinea Company to the knowledge of the lands within the German sphere (*Nachrichten über K. Wilhelms Land*, etc., 1893, pp. 42, *seq.*). Herr Kärnbach reports on a cruise in the *Ysabel* along the north coast of New Guinea in May of last year, during which the Le Maire (or Schouten) Islands were also visited. These are volcanic, mostly densely wooded, partly with coconut palms, with which Lesson Island in particular is almost covered. The coast westward from Dallmann Harbour was found to be much more thickly peopled than the shores of Huon Gulf, the houses of the numerous villages being built on piles. Among them were some resembling temples, like those of Humboldt Bay. Coconut and Nipa palms were observed, and canoes of large size resembling the *sampangs* of Java. The *Ysabel* also touched at the low-lying Tiger Island, over 80 miles from New Guinea, which is almost covered with coconut palms. This was apparently the first time a ship had put in at the island, which is further east than it is placed on the charts, and seems identical with Matty Island. The inhabitants, who are of a totally different type from the Papuans of the mainland, some showing the light colour of the Malays, were unacquainted with iron or tobacco. During the cruise a great number of articles of ethnological interest, as well as copra, were received by barter. Later on the German part of the Solomon Islands was visited by Herr Schmiele in the *Ysabel*, with a view to studying their suitability for settlement, both the eastern and western shores of the principal islands being examined. In the case of Ysabel Island and the southern half of Choiseul, the great obstacle is the great steepness of the shores, which leaves little ground suitable for cultivation.

The former also is very sparsely populated. Villages are placed on almost inaccessible heights and surrounded by walls, as a protection from the head-hunters from the southern islands. The ascent to the Wesleyan mission-station at the south end of the island was a matter of some difficulty. Bougainville, on the contrary, possesses large stretches of level and cultivable land. Tortoise, ivory-nuts, and trepang are the principal products of the islands, the supply of copra being small. On the return voyage the southern coast of Neu Pommern (formerly New Britain) was examined, some good anchorages being found. Here, too, the shores are as a rule steep; a fine river, navigable for boats, was, however, found, and ascended for a few miles, the banks being high, and the air fresh and healthy. Inquiries made at Herbertshöhe of natives of the Tasman and Lord Howe groups present among the workers there, proved the report that those islanders are unacquainted with the use of fire, to be incorrect.

Trigonometrical Survey of Mount Kosciusko and Neighbourhood.—Mr. Joseph Brooks, F.R.A.S., of the New South Wales Trigonometrical Survey, made a journey to Mount Kosciusko in March, 1892, for the purpose of extending the survey from that station in a southerly direction, and he has now forwarded to the Society some interesting notes on the subject, accompanied by a sketch-map, and a series of photographs. Mr. Brooks, who, in addition to the ordinary members of the staff, was accompanied by his wife, two daughters, and son, gives a detailed account of his journey from Spencer's homestead on the Snowy river to his observing station on Mount Kosciusko. The country traversed, as might be expected, was extremely rough, and on one occasion the waggon in which his family were travelling was overturned, and one of his daughters narrowly escaped being killed; but, after overcoming all difficulties, he reached the camping-ground about 1¼ mile to the north-east of Kosciusko Trigonometrical Station, and erected the portable observatory. The instruments used were an eighteen-inch altazimuth instrument, a six-inch theodolite, and three chronometers. A good deal of difficulty was met with in observing the angles on account of the foggy and misty weather, which much delayed the work, but on April 3 the last angles were measured, and the next day the observatory and instruments were brought down off the mountain to the camp. The importance of Mr. Brooks' work is that it has completed the chain of triangles between the Melbourne and Sydney Observatories, thus forming a base from which future surveys may be extended. From observations made by Mr. Brooks, Mount Kosciusko was found to be 7336 feet above sea-level, and Mueller's Peak 7268 feet. For many years Mueller's Peak was considered to be the highest point of the Snowy Mountains, but it is now proved to be 68 feet lower than Mount Kosciusko, the height of which was determined by observations taken from three different stations. The latitude and longitude of Mount Kosciusko were found to be 36° 27′ 26″·3 S., and 148° 15′ 56″·6 E., and were computed geodetically depending on Cooma astronomical station, which had been previously fixed by 333 observations for latitude and 254 for time. While camped at Kosciusko, a minor triangulation of points on the surrounding ranges was made, and the results are shown on the map which has been forwarded, and which, when compared with Townsend's survey of 1846, shows a close agreement, the distance between the two peaks being almost identical. Some of the photographs taken by Mr. Brooks during his journey show that the country about Kosciusko is tame and somewhat uninteresting. It consists of broken granite and quartz ridges, partially covered with grass and low stunted heath, and intersected by swamps through which flow many small streams. About a quarter of a mile to the east of Kosciusko there is an outcrop of slate which reappears on the main range about three-quarters of a mile east of the Victorian Trigonometrical Station.

During the time that Mr. Brooks was encamped, he visited Mueller's Peak, and found there a bottle and two or three tins containing visiting-cards, scraps of paper, and addressed envelopes, showing how large a number of people had visited the peak under the impression that it was the highest point on the Snowy Mountains, or Australian Alps.

Fur-Seals in the Southern Seas.—Mr. F. R. Chapman, in a communication to *The Canadian Record of Science*, made at the request of Dr. George Dawson, furnishes some interesting data regarding the virtual extinction of the fur-seal, once so plentiful on the coasts of New Zealand and Tasmania. It is doubtful, however, how far the figures of sealing catches quoted by early writers referred to the true fur-seal. The earliest reports of the existence of these seals were made by Captain Cook in 1770, and again in 1773. It is certain that the Maoris used seals for food, and were in the habit of making annual hunting-expeditions to Cape Saunders shortly after the breeding season. Sealers were the first European traders to New Zealand; they were followed by whalers, who were succeeded by flax traders, and they finally gave place to the colonists. In 1846, explorers sent by the New Zealand Company found a few seals at Cape Foulwind; but it is difficult now to determine the northern limit of the seal, but they seem to have been rare in the North Island. They were very plentiful in Bass Strait (lat. 38°), where one of the early sealers likens the scene to "a crowded farmyard," and Bass himself "had to fight his way up the cliffs against the seals." During the first years of its settlement, Tasmania was a resort of sealers, who slaughtered without regard to sex or season. Polock, one of the most reliable authorities in the early days of New Zealand, writes that before 1825, seals were so abundant on the southern coasts that many shore parties secured 100,000 skins in a season; a lucrative business it must have been, for skins were selling at a guinea apiece in London. At the present time on the southern coasts a seal is only seen once in ten years or so, although in the sounds of Western Otago there are a few inaccessible rocks where seals still breed. Far richer than the mainland, however, were the outlying islands to the south. The Snares group, 63 miles south of Stewart Island, once swarmed with seals, but they have long ago been exterminated, as the group of islands was very small. The Auckland Islands, much cut up by inlets, with numerous sea-caves and precipitous cliffs affording ideal "rookeries," were crowded with seals when discovered, and even in 1885 they were by no means extinct. Campbell Island has recently yielded very few seals; but Macquarrie Island, which is outside the jurisdiction of New Zealand, was once the most remarkable sealing-ground in the southern hemisphere. Its discovery was kept secret, and probably the entry of a large cargo of skins from Fiji was one of the methods employed to keep the secret. There are no cliffs, the herbage everywhere dipping nearly to the sea. Ultimately the seals were destroyed by dogs, but recently the further destruction of native fauna has been prohibited by the Tasmanian Government. Antipodes Island, solitary and mountainous, is now almost deserted by the once numerous seals. The Bounty Islands, a small rocky group destitute of water and herbage, yielded some hundreds of seals during a recent season. The Chatham group, a sealing-ground from its discovery, is still visited by small numbers. The depletion of seals has been due mainly to reckless slaughtering, but the gradual peopling of the coasts has contributed to the result. Once or twice in recent years, when left undisturbed, the seals have returned; but only by an effective protection can there be even a partial restoration of seal-fisheries, and now these can only be established on the desolate islands or the uninhabited western coast of New Zealand.

PHYSICAL AND MATHEMATICAL GEOGRAPHY.

Exploration of the Black Sea.—The last volume of the *Memoirs* of the Novorossian (Odessa) Society of Naturalists (vol. xviii. 1, 1893) contains a further paper by A. A. Lebedintseff, on the exploration of the Black Sea in 1892, on board the transport *Ingul*, accompanied by a very useful map showing the results of all the measurements of depths which have been made during the last few years. The researches of the year 1892, which were carried on with the special purpose of more accurately ascertaining the chemical composition of water at different depths, further confirm the previously obtained results as regards the distribution of sulphuretted hydrogen. No traces of it have been found at depths less than from 100 to 150 fathoms, while its amount gradually increases with the depth. The results may be tabulated as follows, the litre of water containing the following numbers of cubic centimetres of sulphuretted hydrogen at the following depths:—

Fathoms.	Cubic centimetres of sulph. hydr.	Fathoms.	Cubic centimetres of sulph. hydr.
90	0	200	215
110	34	300	392
125	71	500	570
170	140		

It has been further confirmed, moreover, that the sulphuretted hydrogen of the deep waters of the Black Sea originates, not from organic matters, but from the inorganic sulphuric acid anhydride.

The Temperature of Caves.—Probably no one has explored so many caves, abysses, and springs as M. Martel; and during the past five years he has made a thousand observations of temperature during his investigations in France, Belgium, Austria, and Greece. He summarizes the main conclusions he has come to in a note in the *Comptes rendus* (vol. 118, p. 615), reserving full discussion for a chapter in his forthcoming book on his underground discoveries. The temperature of the air in caves does not correspond to the mean annual temperature of the place, for it is not constant through the year, nor even uniform in the same cavern. The temperature of water found in such caves is variable in both of these ways, and often differs somewhat from that of the surrounding air. Water may act in two ways, for if it slowly oozes into a cavern and then evaporates, the air-temperature is lowered; but if it flows in abundantly, then it brings with it all the variations it undergoes in the outer air with changing season. Fissures in the rocks may allow the external air to enter a cave slowly, just as they let water trickle in. The nearness of hot springs, or volcanic centres (even extinct), may help to heat a cave. The form of the cavern is of importance, for currents naturally exist in any hollow with two openings, the temperature is rarely constant in a sand-glass-shaped grotto, and a mass of dense cold air becomes imprisoned by its own weight in some deep hollows.

Variations in the Composition of Lake Waters.—M. A. Delebecque summarizes in the *Comptes rendus* (vol. 118, No. 11) the results of his investigations as to the composition of dissolved salts in the waters of Lakes Annecy, Aiguebellette, Nantua, St. Point, Geneva, and Bourget. He finds the quantity of magnesia constant for each lake at all depths and in all seasons; but carbonate of lime is in defect in the surface waters and to a depth of about 50 feet during the summer, probably owing to the action of living organisms. In autumn the cooling of the surface water causes vertical mixing, and consequently during winter the matter in solution is the same at the surface as it is at the bottom. But the proportion of dissolved matter increases in each lake as the winter advances, and it is suggested that the affluents are richer in such dissolved matter than the lake itself. The effluents have always the same composition as the surface waters, from which they consequently appear to be supplied.

GENERAL.

Physical Geography for Sailors.—In the last number of the *Nautical Magazine*, Captain Wilson Barker publishes an attractive article on "Natural History as a Recreation for Sailors," using the words "Natural History" in the wide sense usually denoted by Physiography. He points out the pleasure which seafaring men might derive from their innumerable opportunities of observing the phenomena of nature afloat and on shore, and strongly urges his fellow-sailors to take up at least one branch of study for their own entertainment.

Death of Colonel Ellis.—We regret to record the death of Lieut.-Colonel Alfred Burdon Ellis, C.B., of the 1st Battalion West India Regiment, who was in command of the recent expedition against the Sofas. He died at Tenerife, on March 5, from fever contracted during the short but arduous campaign which he had successfully conducted. Colonel Ellis was born in 1852, and, entering the army in 1872, he served first in the West Indies, and subsequently for many years in West Africa. Here, while diligent in the discharge of his military duties, he found time to study the native languages and races of the Guinea coast, and to record the result of his researches in a series of valuable books. Of these, the most important from the geographical point of view are those treating of the three main linguistic stocks of Northern Guinea—the Chi-speaking people of the Gold Coast in 1887, the Ewé-speaking people of the Slave Coast in 1890, and the Yoruba-speaking people in 1894. The last book was completed just before the outbreak of the recent hostilities. In addition, Colonel Ellis wrote a 'History of the Gold Coast,' which was published in 1893. He was a fine example of the best type of British officer who is a writer as well as a fighter, and able to take advantage of the unique opportunities for enriching science which border-warfare presents.

Colonial Geography.—At a meeting held in Brussels early this year, an International Colonial Institute was founded, the first public meeting of which takes place in May. The objects of the new institution are stated by the *Bulletin* of the Belgian Geographical Society to be: (1) The comparative study of the governments and legislation and economic conditions of the different colonies of various nations; (2) to facilitate exchange of views between those interested in the colonies of the different colonial powers; (3) the formation of an international bureau for the preservation and publication of colonial information. The office-bearers of this new institution are M. Léon Say (Paris), President; M. Fransen van de Putte (the Hague) and Lord Reay (London), Vice-Presidents; and M. Camille Janssen (Brussels), Secretary. An attempt is also being made at Brussels to form a Belgian Society for Colonial Studies, which is intended to be concerned mainly with the Congo State, but to include also the collection of information as to foreign methods of colonization. The creation of two bodies with similar objects, both having their head-quarters in Brussels, appears somewhat impracticable, although the intelligent study of colonial questions is a matter of sufficient importance to justify almost any attempt in that direction.

Geographical Instruction in American Public Schools.—A paper on this subject by Mr. W. B. Powell, read at the Chicago Conference of American and European Geography, appears in the *National Geographic Magazine* for January. The most important ends in the study of geography are considered to be to train the learner to recognize geographical phenomena, to understand them from symbols and maps, and to impart knowledge, the last purpose being dependent on the first two having been systematically carried out. The methods recommended are essentially those of the *Heimatskunde*. Mr. Powell lays stress on the study of plants and animals in nature, and of atmospheric phenomena. Then he advises the use of a

symbol, the sand-board as an introduction to the map; next comes the effort to read correct maps of parts of the city. This completes the first circle in the teaching of geography in the schools of Washington. The aim of the work is to put the learner's mind in a rational attitude rather than to give mere geographical knowledge; the child, indeed, does not know that he has been studying geography, but he has been growing familiar with natural forms and processes. The second circle of studies begins with humanistic phenomena, such as are presented in the city with its buildings, streets, bridges, and water-system. Then come facts caused by climatic conditions—the growth of flowers, migration of birds; next the child is instructed in the field, shown the decay of rocks, the making of soil, formation of valleys, denuding of hill slopes, until the geographical alphabet is fairly acquired. The child is then prepared to study a section of country, noting the characteristic features and recording them in plastic materials. Then follow the representation from the sand map in pencil, and the translating of wall maps into plastic representations. The child is now fit for the study of the world as a whole, the great land and water divisions, the climatic zones, etc., and after that to follow profitably the study of the world as the home of man. Thus political divisions, commercial centres, character of peoples, natural products, means of locomotion, come in only at the last stage. The whole object of the teaching is to train the children how to study geography, especially the geography of man, as he is related to the activities of the world, and to its ever-changing geographical phenomena.

OBITUARY.

General Sir George Balfour, K.C.B.

One of our oldest fellows, General Sir George Balfour, K.C.B., Royal (late Madras) Artillery, died on March 12 at his residence, 6, Cleveland Gardens, Hyde Park, at the age of eighty-four. His father, Captain George Balfour, was also in the service, and the son was educated at the Military College at Addiscombe, entering the Madras Artillery at the age of sixteen. He served with the Malacca field force in 1832 and 1833, in the Karnul (Kurnool) campaign, including the action of Zorapur in 1839, and on the staff throughout the China war, from 1840 to 1842, for which last service he gained the medal. It was not till 1844 that Balfour obtained his captaincy, and three years later he was elected a Fellow of the Royal Geographical Society. In March, 1844, he was appointed Consul in the district and city of Shanghai, where he remained for two years. He was a member of the Military and Marine Boards at Madras from 1851 to 1857, during which period he gained the distinction of the Companionship of the Bath, and for four years subsequently he held the post of Inspector-General of Ordnance and Magazines. He was first a member and then president of the commission on military finance, a branch of administrative work which always occupied his special attention; and he also served on the Royal Commission for recruiting. From 1868 to 1872 he was assistant to the Comptroller-in-chief at the War Office, and during the tenure of this office he was promoted to the honour of the K.C.B. From 1872 to 1892 he sat in the House of Commons as Liberal member for Kincardineshire. He always displayed great interest in Indian topics, and particularly in all matters connected with military finance and sanitation. He retired from the army in 1879.

CORRESPONDENCE.

The Battle-field of Platæa.

M. Amadée Hauvette, in an interesting paper published in the *Nouvelles Archives des Missions Scientifiques et Littéraires*, 1892, discusses with a certain amount of detail the topography of the field of Platæa, which he had visited in the previous year. He opens his account with an assertion which is rather startling to one who has examined the ground in detail, in that he says that, thanks to the work of Stanhope and Leake, the general topography of the field is a matter of certainty at the present day. It is quite true that Leake's map has been accepted hitherto as an authority on the subject, but it can only have been so accepted because it was practically the only map of the district available. It is on an exceedingly small scale—a scale, indeed, far too small for it to be of any real practical value as a test of the account given by Herodotus. M. Hauvette prints in his paper a map made by the French staff, which is also on an exceedingly small scale of 1 to 200,000, and which is little more than a sketch, and a not very accurate one at that, of the neighbourhood. Important ridges and streams are entirely omitted, and the roads and tracks are sketched in both roughly and inaccurately. M. Hauvette, however, seems to have acknowledged the impossibility of working on the existing maps, and to have merely used them as an aid to his own topographical examination of the field.

It would require more time and space than is at my disposal to follow M. Hauvette's account in detail; and I shall confine myself to a very brief survey of the main questions which he raises, and the decisions at which he arrives respecting them. In the first place, he only spent three days on the field. Can any one pretend to give an authoritative opinion on the details of 20 square miles of complicated country after a stay of only three days upon it? I fancy that M. Hauvette would be the last to make any such claim. M. Hauvette speaks of the American excavations at Platæa, and says that the temple of Hera was not discovered in the course of them. I think, however, that the Americans claim to have discovered the site of the temple in, as far as could be made out from their account, much the same position as Leake conjecturally allotted to it.

The inscriptions relating to the temple of Eleusinian Demeter to which M. Hauvette refers were discovered by Dr. Merethides of Kriekouki, who showed me the spot where he found them. It is within 100 yards west of the direct road from Athens to Thebes, close to an ancient well. Dr. Merethides believed this to be the temple mentioned by Herodotus, but admitted that, if that was the case, Herodotus' account of the action which took place near it, and of the movements which preceded the action, is wholly incomprehensible. I have had occasion to point out in my memoir on 'The Battlefield of Platæa,' published by the Geographical Society, that temples of Eleusinian Demeter were comparatively common in this region, and that the site of the temple mentioned by Herodotus is to be looked for on the ridges nearer to the Asopus River.

I see that M. Hauvette recognizes the impossibility of reconciling this position with Herodotus' account of the battle.

M. Hauvette has made the mistake which his predecessors have made with regard to the passes leading on to the field from the south. He only recogniz s two, whereas there are three, viz.:—

1. Dryos Kephalæ, through which passes the main road from Athens to Thebes.

2. That through which passed the road from Athens to Platæa, which road left the Thebes road on the Attic side of the range near Eleutheræ, passed some way up a valley to the west, and then went over the ridge of Kithæron, debouching

into Bœotia immediately to the west of Kriekouki. The political reasons for the route chosen for this road are obvious.

3. The pass on the Megara-Platæa road, which comes down a valley from one to three-quarters of a mile east of Platæa.

It is curious that all these passes are marked on maps made long before I surveyed the country, but no single map marks all three of them.

M. Hauvette accepts Leake's location of Hysiæ, and says that "Herodotus states that the Greeks camped first at the foot of Kithæron, at Hysiæ, and at Eleutheræ." This may be a slip of the pen on M. Hauvette's part, but it is an obvious misstatement of what Herodotus really does say.

M. Hauvette places the temple of Demeter in the position assigned to it by Mr. Irving Hunt. I have pointed out in my paper that the difficulties of so placing it are as follows:—

1. That any combat taking place near it must have been audible and possibly visible to those in Platæa.

2. That cavalry could not have acted on the ground.

3. That the trophy must have been erected near this spot, as Mr. Irving Hunt remarks, but that the spot is only 9 stadia from the point mentioned by Pausanias as being 15 stadia from the trophy.

4. That Herodotus' account of the later events of the battle, which is perfectly in accord with the hard topographical facts, if rightly taken, must be pronounced incomprehensible if the last great fight be assumed to have taken place on this spot.

M. Hauvette apparently assumes that Leake's location of the first position of the Greeks is correct. Leake's conjecture as to this position was due to the fact that he, in the face of what Pausanias says, placed Eleutheræ far away from the Athens Platæa road. Now, if the Greeks took up this position, their retreat, as M. Hauvette admits, was cut off, for they would leave Dryos Kephalæ open to the Persians. This is, to say the least of it, improbable.

M. Hauvette could not find Leake's Gargaphia. The spring is now enclosed in a well; but there is a copious supply of water.

M. Hauvette places the Heroon of Androcratus on the heights of Platani, *i.e.* beyond the Church of St. John in my map. What about the 6 or 7 stadia mentioned by Thucydides? The position is impossible. There is an evident error in Herodotus' topography of the second position of the Greeks, an error which is by no means inexplicable, and this seems to have misled M. Hauvette. Still M. Hauvette's location of the second position of the Greeks corresponds in the main with that which I believe to be correct.

M. Hauvette accepts unexamined the "Island" of Leake, and says that the generals wished to shelter the army behind the Oeroe. Did it occur to him to consider how it could be possible that the Greek generals, having found the Asopus insufficient protection, should consider any one of the little streams of the Oeroe a desirable line of defence?

From this point our views naturally diverge so widely, owing to the necessities of interpretation laid on M. Hauvette by his acceptance of Leake's Island, that it is impossible for me to follow him.

When all is said, M. Hauvette could not, after three days' stay, pretend to contest seriously the views of his predecessors, though, as a fact, Colonel Leake admits that he did not spend a longer time on the ground.

G. B. Grundy.

Peak K_2.

Colonel Godwin-Austen addressed to me, in my capacity as Editor of the *Alpine Journal*, a letter upon the identification by Drew of the peak K_2 in a certain view. He did not inform me that he was sending you an almost identical letter. I have answered—it was not difficult—Colonel Godwin-Austen in the *Alpine Journal*; I do not propose to ask you to reprint my answer in your pages, for the matter under discussion is not important. Suffice it here to say that K_2 is known to have a double summit, because I have seen it from several places and on several occasions, and photographed it; and the double summit appears in the photographs even if it does not appear in Colonel Godwin-Austen's sketches. In Captain Younghusband's sketch of the peak, a copy of which can be seen in your map-room, the double summit is likewise conspicuous. Secondly, I may say that Drew's sketch only shows the top 5000 feet of K_2, the whole of which would be easily visible above everything along the line of the ray drawn by Colonel Godwin-Austen on his map. I may further add, in justice to the printers, that the block of K_2 in question was not printed crooked in the February *Alpine Journal*.

W. M. Conway.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1893-94.

Tenth Ordinary Meeting, April 23, 1894.—W. T. Blanford, Esq., LL.D., F.R.S., &c., Vice-President in the Chair.

Elections.—*Arthur Bellin; Geoffrey Fowell Buxton, J.P.; Thomas Soanes, Cooper, C.E.; John Dale, J.P.; Rev. M. Hill Dana, M.A., LL.B.; B. L. D'Aubigne; Arthur Elslob; Frederick Joseph Ernst; Colonel John Farquharson, C.B., R.E., Director-General of the Ordnance Survey; Richard Hargraves Greenwood; C. Leonard Hocking; Nathaniel J. Lyon (Grenadier Guards); John Charles Morris; Arthur Millington Naylor; Howard Ruff; Joseph Taylor; W. A. Wills.*

The Paper read was:—

"The Face of the Earth." By Professor C. Lapworth, LL.D., F.R.S.

Eleventh Ordinary Meeting, May 7, 1894.—Clements R. Markham, Esq., C.B., F.R.S., President, in the Chair.

Elections.—*Rev. John Batchelor; Adolphus Edward Caddy; Captain W. Fairholme, R.A.; Charles Maidment; V.-Lieut. H. M. Maxwell, F.R.C.V.S.; L. E. North-Tzigertoary; George Scriven, M.D.; John Thomas Walsh.*

The Paper read was:—

"The Bakhtiari Mountains and Upper Elam." By Lieut.-Colonel H. A. Sawyer.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. R. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Austria—Olmütz. *Globus* **65** (1894): 249-252. **Lechner.**

Die deutscher Sprachinsel um Olmütz. Von Dr. Karl Lechner, Kremsier.

Olmütz, in the midst of a Czech-speaking population, has two-thirds of its inhabitants speaking German, and the same peculiarity occurs in the surrounding villages.

England—Devon. *Quarterly Review* **178** (1894): 414-481. ——

The Pleasant Land of Devon.

An important article dealing with the characteristics of Devonshire people as related to the geographical conditions of their home.

England—Mersey. **Richards.**

Report on the Present State of the Navigation of the River Mersey (1893), to the Right Honourable the Commissioners for the Conservancy of the Mersey. By Admiral Sir G. H. Richards, K.C.B. With Appendix. London, Eyre and Spottiswoode, 1894. Size 9½ × 6½, pp. 19. *Presented by the Commissioners.*

England—Somersetshire. **Barrett.**

Somersetshire: Highways, Byways, and Waterways. Written and illustrated by C. R. B. Barrett. London, Bliss, Sands, & Foster, 1894. Size 10½ × 8, pp. xv. and 366. *Price* 21*s.*

A handsomely illustrated volume in which the chief archæological remains, ecclesiastical buildings, old manor-houses, etc., of the county are well represented.

France—Flanders. *Rev. G.* **33** (1893); **34** (1894): 31-45, 193-200, 276-282. **Malotet.**

La Flandre Française. Par A. Malotet.

The paper shows how the low level plain of Flanders, without natural divisions, with an inhospitable coast and damp climate, but covered with a soil which became fertile on cultivation and containing deposits of useful minerals, has exercised an influence on its inhabitants, who were required to be from the first engineers as well as husbandmen, traders as well as manufacturers, and soldiers as well as citizens.

France—Franche-Comté. *Ann. G.* **3** (1894): 319-345. **Killian.**

Contribution á la connaissance de la Franche-comté septentrionale. Les Collines préjurassiennes et le Jura du Doubs. Par W. Killian.

A good piece of regional geography, with a brief bibliography.

France—Jura. *Tour du Monde* **67** (1894): 273-288. **Renauld.**

Baume-les-Messieurs (sa Grotte, ses Environs). Par M. Edmond Renauld.

A description, with fine illustrations, of the exploration of one of the caverns of the Jura, carried out last year in continuance of the systematic study of underground geography which the enthusiastic researches of M. Martel have set on foot in all parts of Europe.

France—Lakes. *Nouvelles G.* (1894): 33-37. **Delebecque.**

L'Etude des lacs en France. Par E. Delebecque.

An extremely clear and concise statement of the leading results of limnological research in France.

"If every one would give but a shilling our object would be gained."

ST. HELENA RELIEF FUND.

COMMITTEE.

SIR ROBERT G. W. HERBERT, G.C.B., late Under Secretary of State for the Colonies.
SIR JAMES D. MACKENZIE OF TARBAT, BART.
VICE-ADMIRAL E. FIELD, M.P.
MAJOR-GENERAL GRANT BLUNT, R.E., late Acting Governor of St. Helena.
J. C. MELLISS, ESQ., M.I.C.E., F.G.S., late Commissioner of Crown Property, St. Helena.
R. A. STERNDALE, ESQ., F.R.G.S., F.Z.S., Hon. Secretary, *Worcester Park, Surrey.*

AN APPEAL is made to the British public for a sum of £2,500 to start relief operations in the Island of St. Helena, the inhabitants of which have been reduced to penury by the force of circumstances.

This little island, so celebrated in history as the place where Napoleon ended his eventful career, had until the opening of the Suez Canal a prosperous existence. It was a point of call for about a thousand ships per annum, and its population of 5,000 souls had ample provision in the busy traffic of the port of Jamestown. From the date of the opening of the Suez Canal, the number of ships calling at St. Helena has yearly become less, and has now dwindled to about one-fourth.

The Governor, in his annual report for 1892, relates how keen was the distress on the island in August of that year, when he had to start relief works for the women and children only, and how, after three weeks, the arrival of a man-of-war dispelled anxiety for the time.

The population has already decreased in number, owing to the able-bodied men migrating to the Cape in search of employment, but the condition of the remainder is now engaging the anxious care of those who are interested in this far-off island.

The most practical scheme is the development of the fisheries and the starting of a fish-curing industry. Hitherto all attempts in this direction on the part of the islanders have failed for want of knowledge. Fish abounds to such an extent that the fishermen either abstain from catching more than a certain quantity sufficient for the local market, or throw their surplus back in the sea. The price gained is so small that the industry does not pay for the purchase of the other necessaries of life, which have to be imported, and are dear in consequence. It is to utilize this waste and to teach the people the proper way of curing fish, that the Committee desire to raise a fund which will enable them to purchase a couple of suitable boats, with full complement of nets and gear, to engage the services for a time of experienced fish-curers, and to establish a school for the training of the islanders—on the same system as that which has done so much for Baltimore in Ireland. The Government have offered to place certain public buildings in St. Helena at the disposal of the Committee, who, in laying the facts before the public, hope to enlist the sympathy and support of those who are willing to aid in the work of relief, and will gladly give any further information on the subject.

Messrs. Barclay, Ransom, Bouverie & Co., 1, Pall Mall East, S.W., have kindly consented to receive Subscriptions. Cheques and postal orders for small sums crossed to them should be drawn in favour of "The St. Helena Relief Fisheries Fund."

See "THE TIMES" of 5th May—"AN ISLAND IN EXTREMIS."

France—Montpellier. **Coste.**

B.S.G. Languedocienne **14** (1892): 351, 599; **15** (1893): 150, 269; **16** (1894): 53, 341.
Les Transformations du Montpellier depuis la fin du XVII^e^ siècle jusqu'à nos jours. Par le Dr. Léon Coste.

This is a remarkably detailed record of the growth of a modern town.

Germany—Baltic Lake Ridge. **Bludau.**

Die Oro- und Hydrographie der preussischen und pommerschen Seenplatte. Von Dr. Alois Bludau. Gotha, Justus Perthes, 1894. Size 11 × 7½, pp. ii. and 64. *Price* 6 *marks. Presented by the Publisher.*

This forms Ergänzungshaft No. 110 to *Petermanns Mitteilungen*, and is accompanied by a handsome orographical map of the district. It will be specially noticed.

Germany—Inland Navigation. *Deutsche Rundschau G.* **16** (1894): 323–325. ——

Die schiffbaren Wasserstrassen des Deutschen Reichs. (Mit einer Karte.)

The map shows the complete system of navigable rivers and canals which covers the German empire, and the text consists mainly of a table giving the number of kilometers of navigable waterway on the different branches of each river-system.

Greece—Lake Copais. *Z. Ges. Erdk. Berlin* **29** (1894): 1–90. **Philippson.**

Der Kopaïs-See in Griechenland und seine Umgebung. Von Dr. Alfred Philippson.

This memoir, illustrated by two plates, gives a full description of Lake Copais, one of the best representatives of the "katavothra" lakes of Greece characterized by an outlet through underground channels, the drainage of which is now a matter of practical engineering.

Hungary. *Abrégé B.S. Hongroise G.* **22** (1893): 121–188. **Janko.**

Die ungarische (Székler-) Bevölkerung von Torda, Aranyosszék und Zoroczkó. Von Dr. Johann Jankó.

Dr. Janko's original paper in Hungarian forms a volume of 300 pages, published as part of the Bulletin of the Hungarian Geographical Society, and illustrated by a map, diagrams, and sketches.

Italy—Waterfall of Marmore. **Pennesi.**

Giuseppe Pennesi: La Cascata delle Marmore. Estratto dalla Rivista Geografica Italiana, marzo 1894. Rome, 1894. Size 10¼ × 7, pp. 20. *Presented by the Author.*

Montenegro. *Verh. Ges. Erdk. Berlin* **21** (1894): 112–125. **Hassert.**

Herr Dr. Kurt Hassert: Montenegro auf Grund eigener Reisen und Beobachtungen. *With map.*

This paper is referred to elsewhere in the *Journal.*

Russia—Steppes. *Ann. G.* **3** (1891): 296–318. **Krasnov.**

Steppes de la Russie Méridionale, leur origine, leur évolution, leur flore et leurs corrélations avec les steppes et les prairies de l'Asie et de l'Amerique septentrionale. Par A. Krasnov.

Switzerland—Lake Constance. **Penck.**

Morphometrie des Bodensees. Von Albrecht Penck in Wien. (Seperatabdruck aus dem Jahresbericht der Geographischen Gesellschaft in München, 1894). Size 9½ × 6½, pp. 119–155. *Plate. Presented by the Author.*

This paper will be referred to in detail.

Switzerland—Valais. *Scottish G. Mag.* **10** (1894): 242–252. **Dingelstedt.**

A Quiet Corner of the Alps. By V. Dingelstedt.

The "quiet corner" which Dr. Dingelstedt describes from a summer's residence is the valley of Vièze, in the canton of Valais, at the foot of the Dent du Midi, where many primitive customs survive.

United Kingdom. *J. R. Agricultural S. England* **5** (1894): 39–59. **Price.**

The Census of 1891 and Rural Depopulation. By L. L. Price.

Mr. Price combats Mr. Cannan's argument that the Census returns show a large reduction of the rate of movement of rural populations to great towns. He considers that the returns prove the continuance of rural depopulation, although acknowledging that there does not appear to be any increase during the decade 1881–1891.

ASIA.

Afghanistan. *Asiatic Quarterly R.* **7** (1894): 312-326. **Raverty**

The Independent Afghan or Patan Tribes. By Major H. G. Raverty.

This paper is accompanied by several others treating of different aspects of Afghan life.

Arabia—Hadramaut. *Verh. Ges. Erdk. Berlin* **21** (1894): 126-136. **Hirsch.**

Herr L. Hirsch: Bericht über seine Reise nach Hadramut.

This paper, which is illustrated by a sketch-map, describes the journey which was noticed in the *Journal* for March, p. 196.

Borneo. *Ann. G.* **3** (1894): 371-381. **Chaper.**

Voyage à Bornéo. Par Maurice Chaper.

The journey took place in 1890-91, and was confined to the western division of the island, particularly along the course of the river Kapoeas.

Celebes—Kajang. *Tijdschrift Indische Volkenkunde* **36** (1893): 247-278. **Wiggers.**

Schets nan het Regentschap Kadjang onderafdeeling Kadjang, afdeeling Oosterdistricten, gouvernement Celebes en Onderhoorigheden, door H. D. Wiggers.

Rajang, which is described in this paper, is a small "regency" in the south-east of the southern peninsula of Celebes.

Central Asia. **Popowski.**

The Rival Powers in Central Asia, or the Struggle between England and Russia in the East. Translated from the German of Josef Popowski by Arthur Baring Brabant, and edited by Charles E. D. Black. With a map of the North-Western Frontier of India showing the Pamir Region and part of Afghanistan. Westminster, A. Constable and Co., 1893. Size 9 × 6, pp. xxii. and 235. *Price* 12*s.* 6*d.* *Presented by the Publishers.*

The first chapter deals with Russia's advance in Asia since the fifteenth century. In the second chapter the author endeavours to prove that Russia aspires to the possession of India. The third chapter deals with the political relations of Russia and England in regard to Asia since the commencement of the present century. The fourth chapter, with the strategical relations of Russia and Great Britain. The fifth and last chapter discusses the importance of Great Britain to the Central-European alliance, with final conclusions. The map accompanying the volume was noticed in the *Journal* for November, 1893, p. 478.

India—Ancient. *J.R. Asiatic S.* (1894): 231-264. **Pargiter.**

The Geography of Rama's Exile. By F. E. Pargiter.

A careful study of the Ramayana with the object of identifying the localities referred to, and, by the names employed and the descriptions given, determining whether the knowledge of the author came from personal experience or vague report, and of fixing an approximate date for the poem.

India—Census.

Census of India, 1891. General Report, by J. A. Baines (London, 1893); General Tables for British Provinces and Feudatory States, 2 vols. (London, 1892-93); Report on the Census of the Districts of Ajmere-Merwara, . . . by B. Egerton (Calcutta, 1893); Census of the Lower Provinces of Bengal, 1891, by C. J. O'Donnell. The Provincial Tables (Calcutta, 1893); Report on the Census of Coorg, by H. A. Stuart (Calcutta, 1893), vol. xv. Madras, . . . by H. A. Stuart (Madras, 1893). Size 13 × 8½. *Presented by the Secretary of State for India.*

India.

Account of the operations of the Great Trigonometrical Survey of India, vol. xv., Electro-Telegraphic Longitude Operations executed during the years 1885-86, 1887-88, 1889-90, and 1891-92, and the Revised Results of Arcs contained in volumes IX. and X., also the Simultaneous Reduction and the Final Results of the whole of the Operations. Prepared under the direction of Colonel G. Strahan, R.E. Published under the orders of Colonel H. R. Thuillier, R.E., Debra Dun, 1893. Size 13 × 10, pp. xv., 38, 447, and (18). *Charts and plates. Presented by the Secretary of State for India.*

India—Punjab.

Report on the Administration of the Punjab and its Dependencies for 1892-93. Lahore, 1894. Size 13½ × 8½, pp. xvi., 357, and clxii. *Map.*

Includes a section dealing with the physical features of the country, area, and climate, etc.

Japan. *B.S.R.G. Anvers* **18** (1894): 330–355. **Marischal.**

Le Japon pittoresque. Par M. Arthur Marischal, ancien professeur à l'Ecole supérieure de commerce de Tokyo.

Persia. *Ann. G.* **3** (1894): 278-295. **Houssay.**

La Structure du Sol et son Influence sur la Vie des Habitants, Etudes sur la Perse méridionale. Par Frédéric Houssay.

A summary of the author's observations on the relation between the soil and the people of southern Persia, made during a journey in 1885-86, will appear in the Monthly Record.

Russian Central Asia. *Ann. G.* **3** (1894): 346-370. **Blanc.**

La Colonisation Russe en Asie Centrale. Par Edouard Blanc.

The description of the spread of Russian inhabitants in Central Asia is accompanied by a summary of the geography of the country, and a bibliography of works bearing on the history of Russian conquests in Turkestan.

Syria. *Verh. Ges. Erdk. Berlin* **21** (1894): 201-218. **Oppenheim.**

Herr Dr. Max Frhr. von Oppenheim: Bericht über seine Reise durch die Syrische Wüste nach Mosul. *With map.*

During the summer of 1893, Baron Oppenheim went from Damascus to the Hauran mountains, and thence north-eastward, through Palmyra and Nesibin to Mosul on the Tigris, subsequently descending that river to the sea.

Sumatra. *Bijdragen Nederlandsh. Indië* **10** (1894): 257-320. **Van der Kemp.**

Eene Bijdrage tot E. B. Kielstra's Opstellen over Sumatra's Westkust, door P. H. Van der Kemp.

Sumatra—Toba-lake. *Tijdschrift Indische Volkenkunde* **35** (1893): 640–657. **Dijk.**

De intwatering van het Tobameer en de Batoe Bongbong, door P. A. L. E. Van Dijk.

Lake Toba lies in the centre of the Battak country in Sumatra.

Syr-darya. *Verh. Ges. Erdk. Berlin* **21** (1894): 150–165. **Hedin.**

Beobachtungen über die Wassermenge des Sir-Darya in Winter 1893-94. Mitteilung von Dr. Sven Hedin.

This paper will be summarized in the Monthly Record.

AFRICA.

Benguella. *B.S.G. Lisboa* **13a. ser.** (1894): 1–105. **Pereira do Nascimento.**

Grammatica do Umbundu ou Lingua de Benguella. Por J. Pereira do Nascimento.

The widely-spoken Umbundu language is here made the subject of a close philological study, and its grammar is investigated and illustrated by numerous examples.

Congo State. *Verh. X. Deutschen G.-tages* (1893): pp. 1–28. **Stuhlmann.**

Über die Zwergvölker am Ituri. Von Dr. F. Stuhlmann.

An account of the Pygmy forest tribe first reported by Stanley's expedition.

East Africa. *B.S.G. Marseille* **18** (1894): 111-120. **Pilatte.**

Obock et ses Dépendances. Par L.-W. Pilatte.

An authoritative account of the French colony on the Gulf of Aden.

General. **Lugard.**

East and West Africa in Parliament. By Capt. F. D. Lugard. *From Blackwood's Magazine for January*, 1894.

Madagascar. *B.S.G. Paris* **14** (1893): 289–300. **Grandidier.**

Les Voyageurs Français à Madagascar pendant les trente dernières années. Par Alfred Grandidier.

Contains a number of positions in Madagascar fixed astronomically, and is accompanied by a map of Madagascar in four sheets, showing the itineraries referred to.

Madagascar—Ikongo. *B.S.G. Paris* **14** (1894): 301–328. **Besson.**

Voyage au pays des Tanala indépendants de la région d'Ikongo (Madagascar). Par le Dr. L. Besson.

This journey was made in 1890.

Madagascar—Soil. *C.R.* **118** (1894): 952–958. **Grandidier.**

Du sol et du climat de l'île de Madagascar au point de vue de l'agriculture. Par M. Grandidier.

The object of this paper is to show that, for tropical agriculture to succeed, the peculiar character of the soil—especially of laterite—and of the climatic conditions, in particular the amount and distribution of rainfall, have to be carefully considered. In parts of Madagascar the soil is said to be so infertile that it merely serves as a pot for holding the prepared earth in which each plant grows.

Madagascar—Western. *B.S.G. Paris* **14** (1893): 329–366. **Douliot.**

Journal du Voyage fait sur la Côte Ouest de Madagascar. Par M. Henri Douliot (1891-92).

The first expedition referred to in this paper was in the neighbourhood of Morondava, and the second in the district watered by the river Andranomena.

Seychelles. *Tour du Monde* **67** (1894): 65–80. **Alluaud.**

Voyage aux Iles Seychelles. Par M. Charles Alluaud.

A popular and well-illustrated description of the author's scientific visit to those islands in 1892.

Somali Coast. *B.S.G. Italiana* **7** (1894): 75–90. **Incoronata.**

Notizie riguardanti il portolano della Costa al Nord del fiume Guiba, del cap. di fregata E. Incoronato.

A detailed account of the coast-line north of the Jub.

South Africa. **Barkly.**

Among Boers and Basutos. The story of our Life on the Frontier. By Mrs. Barkly. Second Edition. London and Sydney, Remington & Co., 1894. Size 7½ × 5, pp. viii. and 270.

An account of experiences in Basutoland and the Orange Free State during the late hostilities, 1879-1881.

South Central Africa. **Johnston.**

Reality versus Romance in South Central Africa. An account of a journey across the continent from Benguella on the West, through Bihe, Ganguella, Barotse, the Kalihari desert, Mashonaland, Manica, Gorongoza, Nyasa, the Shire Highlands, to the mouth of the Zambesi on the East coast. By James Johnston, M.D. London, E. Hodder and Stoughton, 1893. Size 10 × 7, pp. 353. *Map and illustrations. Price* 21*s.*

Contains many useful notes regarding the natives encountered, and remarks on the resources of the country, its availability for development, etc., etc. The illustrations from photographs by the author, of which there are fifty-one, are deserving of special notice, and largely add to the value of the work.

Uganda. **Portal.**

Reports relating to Uganda. By Sir Gerald Portal. Presented to both Houses of Parliament by Command of Her Majesty, March, 1894. London, Eyre and Spottiswoode. Size 13 × 8½, pp. 56. *Price* 6*d.*

Zambesi Basin. *J.S. Arts* **42** (1894). **Foa.**

Travels in the Basin of the Zambesi. By Edouard Foa. With discussion.

Observations on the commercial advantages of the Zambesi valley.

NORTH AMERICA.

Alaska. *U.S. Coast and Geodetic Surv. Rep.*, 1891, *Pt. II.*: 487–501. **Reid.**

Report of an expedition to Muir Glacier, Alaska, with determinations of latitude and the magnetic elements at Camp Muir, Glacier Bay. By Harry Fielding Reid.

Appendix No. 14 to the Report, containing a map of the Muir Glacier.

Alaska—Malaspina Glacier. *J. of Geology* **1** (1893): 219–245. **Russell.**

Malaspina Glacier. By Israel C. Russell. *With map.*

Canada—Dené People. *T. Canadian J.* **4** (1894): 1–222. **Morice.**

Notes, archæological, industrial, and sociological, on the Western Dénés, with an Ethnographical Sketch of the same. By the Rev. Father A. G. Morice.

The Dénés are perhaps the most widespread of the North American racial stocks, and the northern branch occupies practically the whole of the Dominion of Canada, except the sea-boards. Father Morice treats the subject very comprehensively, and the memoir is practically a separate book provided with a good index. After discussing the name, characteristics, and philology of the Dénés, he devotes a series of chapters to their stone implements and weapons, bone and horn implements, traps and trapping as applied to fish and land animals, wooden implements, bark implements and other vegetable products, copper and iron implements, and the use of skins and textiles. Subsequent chapters are devoted to dress and ornaments, and in conclusion there is an account of their monuments and picture-writing. The various sections are well illustrated by pictures of implements and dresses, and, in describing the use of each, numerous instances of the peculiar manners and customs of the tribes are cited.

Labrador. *B.G. Club Philadelphia* **1** (1894) : 37–86. **Bryant.**

A Journey to the Grand Falls of Labrador. By Henry G. Bryant.

This Journey was noticed in the *Proceedings*, vol. 14, p. 49. The new account of it is illustrated by a map of Labrador from the *Proceedings B.G.S.* for 1888, corrected so as to show the exact position of the falls.

Labrador. **Canto.**

Quem deu o Nome ao Labrador? (Breve Estudo). Por Ernesto do Canto. (Extract from Archivo dos Açores xii., p. 353.) Size 11¼ × 8, pp. 24. Ponta Delgada, 1894. *Presented by the Author.*

The author endeavours to show that the name Labrador, equivalent to the Portuguese *Lavrador*, a husbandman, was derived from "Joãs Fernandes, lavrador da Ilha Terceira," who is believed to have sailed with the Cabots on their voyage of discovery to North America.

Lake Erie. *American J. Science* **47** (1894): 207–212. **Spencer.**

Deformation of the Lundy Beach and Birth of Lake Erie. By J. W. Spencer.

A sequel to the author's well-known researches on the evidence supplied by high-level beaches as to the origin and deformation of the basins of the great lakes.

Pacific Coast. *J. of Geology* **2** (1894): 32–54. **Diller.**

Revolution in the Topography of the Pacific Coast since the Auriferous Gravel Period. By J. S. Diller.

This will be referred to in connection with other papers bearing on the same region.

United States—Connecticut. *J. of Geology* **1** (1893): 371–393. **Kummel.**

Some Rivers of Connecticut. By Henry B. Kummel.

An interesting paper giving first a general account of the topography of Connecticut, and then a sketch of its geological history treated with special reference to the original systems of drainage and the changes which have occurred in it.

United States—Florida. **Caravia.**

Eugenio Ruidíaz y Caravia. La Florida. Su conquista y colonización por Pedro Menéndez de Avilés. 2 vols. Madrid, J. A. Garcia, 1893 and 1894. Size 9 × 6, pp. (vol. i.) ccxlii. and 416, (vol. ii.) 804. *Maps and illustrations. Presented by the Author.*

Vol. i. consists of a history of Florida and a lengthy memorial of Dr. Gonzalo Solis de Merás, while vol. ii. is composed of appendices dealing with the maps and other documents of Pedro Menéndez de Avilés.

United States—Massachusetts. *J. of Geology* **1** (1893): 803–812. **Gulliver.**

The Newtonville Sand-plain. By F. P. Gulliver.

Mr. Gulliver describes the method by which he constructed a model of an interesting glacial relic—a sand-plain fed by an eskar—and discusses the formation of such features and their effect on the scenery of the district where they occur.

United States—New York. **King.**

King's Handbook of New York City. An Outline History and Description of the American Metropolis. Planned, Edited, and Published by Moses King. Second Edition, Boston, Mass., 1893. Size 8 × 6, pp. 1008.

A profusely illustrated description of New York City, embracing its area, population, wealth, statistics, etc., water-ways, thoroughfares, public buildings, and other interesting features.

United States—Ohio Basin. **Chamberlin and Leverett.**

American J. Science **47** (1894): 247–283.;

Further Studies of the Drainage Features of the Upper Ohio Basin. By T. C. Chamberlin and Frank Leverett.

This paper will be referred to in the Monthly Record.

CENTRAL AND SOUTH AMERICA.

Argentine. *B.S.R.G. Anvers* **18** (1894): 414–457. **George.**

La république Argentine, son histoire, sa géographie, ses produits. Par M. Louis George.

A compilation strengthened by the experience of three years spent in the Argentine Republic.

Argentine—Pampas. *B.J.G. Argentino* **14** (1893–94): 292–368, 419–466. **Ambrosetti.**

Viaje a la Pampa Central. Por Juan B. Ambrosetti.

An exhaustive account of a long journey through the Pampa territory of the Argentine Republic, with speculations as to the future value of the country when it is adequately exploited and attains the rank of a province.

Bolivia. *B.S.G. Italiana* **7** (1894): 61–74. **Balzan.**

Da Villa Bella a Trinidad, Relazione, originale di viaggio. Del Prof. Luigi Balzan.

Journal of a journey up the Mamore river in the east of Bolivia.

Bolivia. **Mercier.**

Diario de una Expedicion del Madre de Dios al Acre. Por Victor Mercier. La Paz, 1894. Size 7½ × 5, pp. 16. *Presented by the Author.*

This memoir is referred to elsewhere.

Brazil. *J. of Geology* **1** (1893): 753–772. **Branner.**

The Supposed Glaciation of Brazil. By John C. Branner.

Mr. Branner sums up a careful study of the evidence for the former existence of glaciers in Brazil thus: "I did not see, during eight years of travel and geological observations that extended from the Amazon valley and the coast through the highlands of Brazil, and to the headwaters of the Paraguay and the Tapajos, a single phenomenon in the way of boulders, gravels, clays, soils, surfaces, or topography that could be attributed to glaciation."

Costa Rica—Terraba tribe. **Pittier and Gagini.**

A. I. Fisico-G., Costa Rica **4** (1891): 71–100.

Essayo lexicografico sobre la lengua de Terraba. Por H. Pittier y C. Gagini.

A grammar and vocabulary of the language spoken by the Terraba people of Costa Rica, the native words being given with their Spanish equivalents.

Peru. *J. Tyneside G.S.* **2** (1894): 215–229. **Markham.**

Peru. By Clements R. Markham.

An address delivered to the Tyneside Geographical Society at Newcastle on October 6, 1893.

South American People. *B. American G.S.* **25** (1894): 1–31. **De Kalb.**

The Social and Political Development of the South American People. By Courtenay De Kalb.

A sketch of the position and progress of the Spanish Americans compared with the people of North America, with the object of showing that the South Americans form a race which, while incapable of becoming assimilated to Anglo-Saxon methods or ideas, has a special destiny of its own, and will before long require to be seriously considered in international relations.

Uruguay. *B.S.G. Paris* **14** (1893): 376–389. **Queirel.**

Voyage de San Javier au Chutes du Mocana (Haut Uruguay). Par Juan Queirel.

West Indies—St. Bartholomew. *Deutsche G. Blätter* **17** (1894): 43–84. **Ludwig.**

Geographische und geognostische Umschau auf der Insel St. Barthélemy. Von R. Ludwig. *With map.*

This account of a visit to St. Bartholomew is largely geological, containing several sections illustrating the geological structure of the land; and it also describes the industry of digging phosphates, which is of considerable importance.

AUSTRALASIA.

Australia. *Scottish G. Mag.* **10** (1894): 169–184. **Shaw.**

Australia. By Miss Flora L. Shaw.

An account of the conditions and prospects of Australia at the present time.

Australian Bibliography.

Australian Bibliography. (In three parts.) Catalogue of Books in the Free Public Library, Sydney. Relating to, or published in, Australasia. Sydney, C. Potter, 1893. Size 11½ × 10, pp. ix., 435, 584, and 226. *Price* 10*s.*

The present catalogue, containing nearly 8000 books and pamphlets, has been brought down to the year 1888. It consists of three parts:—Part I. A complete list of authors, etc., with full title; Part II. Authors of books relating to the Colonies; Part III. A complete classified Subject and Title Catalogue, with a General Index to the subjects.

Australia—Early Discovery. *J. Manchester G. S.* (1892): 238–244 **Morgan.**

Notes on the Early Discovery of Australia. By Mr. E. Delmar Morgan. *With maps.*

Bismarck Archipelago—New Mecklenburg. *Petermanns M.* **40** (1894): 73–82. **Pfeil.**

New Mecklenburg. Von Joachim Grafen Pfeil.

Descriptions of the part of New Mecklenburg formerly known as New Ireland, traversed by the author in 1888, and accompanied by a map.

Hawaii. **Marcuse.**

Die Hawaiischen Inseln von Dr. Adolf Marcuse. Berlin, R. Friedländer & Sohn. 1894. Size 9½ × 6½, pp. iv. and 186. *Price* 9*s.*

Dr. Marcuse, while engaged in astronomical observations at Hawaii for thirteen months, occupied his leisure in studying the Sandwich Islands and their people, and this little volume records his impressions. It is well illustrated from photographs.

New South Wales. **Bladen.**

Historical Records of New South Wales. Vol. II.—Grose and Paterson. 1793–1795. Edited by F. M. Bladen. Sydney, C. Potter, 1893. Size 9×6, pp. xxvii. and 936. *Plans.*

The Appendices contain, among other things, extracts from the Journal and Letters of Mrs. Elizabeth Macarthur, 1789–1795; the Journal of Lieutenant (afterwards Governor) P. G. King, 1786–1790; and selections from the Journal and Letters of Daniel Southwell, 1788–1792.

New South Wales. **Hanson.**

Geographical encyclopædia of New South Wales, including the counties, towns, and villages within the Colony, with the sources and courses of the rivers and their tributaries. Ports, harbours, light-houses, and mountain ranges. Postal, money-order, and telegraph offices, and savings banks. The railways and stations on each line. The public schools, and the county in which each school is located. With a map, and diagram of light-houses on the coast. By William Hanson. Sydney, C. Potter, 1892. Size 10 × 6½, pp. 462. *Price* 12*s.* 6*d.* *Presented by the Agent-General for New South Wales.*

New South Wales—Climate. **Russell.**

Hail Storms. By H. C. Russell. [Read before the Royal Society of N.S. Wales, November 2, 1892.] Size 9 × 6, pp. 4. *Chart. Presented by the Author.*

New South Wales—Climate.

Diagram of Isothermal Lines of New South Wales.

This diagram is intended to convey a general view of the mean shade temperature in the various districts of the colony of New South Wales.

New South Wales—Meteorology. **Russell.**

Results of Rain, River, and Evaporation. Observations made in New South Wales, during 1892, under the direction of H. C. Russell. Sydney, C. Potter, 1893. Size 10 × 6, pp. xl. and 163. *Maps and Diagrams. Price 3s. 6d.*

Tasmania. *J. S. Arts* **42** (1894): 481–495. **Levey.**

Tasmania, and the forthcoming Hobart International Exhibition, 1894-95. By G. Collins Levey.

A brief history of the colonization of Tasmania, followed by a review of the present industrial position of the colony.

Victorian Year-Book. **Hayter.**

Victorian Year-Book, 1893. By Henry Heylyn Hayter, C.M.G. Melbourne, London: Kegan Paul & Co., 1893. Size 8½ × 5¼, pp. 491. *Map. Presented by the Author.*

POLAR REGIONS.

Arctic Voyages. **Christy.**

The Voyage of Captain Luke Foxe of Hull, and Captain Thomas James of Bristol, in search of a North-West Passage, in 1631–32; with Narratives of the earlier North-West Voyages of Frobisher, Davis, Weymouth, Hall, Knight, Hudson, Button, Gibbon, Bylot, Baffin, Hawkridge, and others. Edited, with Notes and an Introduction, by Miller Christy. 2 vols. London, printed for the Hakluyt Society, 1894. Size 9 × 6, pp. xvi., ccxxxi., and 681. *Portraits, facsimiles, etc. Presented by the Hakluyt Society.*

Form Nos. LXXVIII. and LXXXIX. of the Hakluyt Society's Publications.

Greenland. *Verh Ges. Erdk. Berlin.* **21** (1894): 137–150. **Drygalski and Vanhöffen.**

Von der Grönland-Expedition der Gesellschaft für Erdkunde. I. Bericht über die Heimreise der Expedition von Grönland. Von Dr. Erich von Drygalski. II. Biologische Beobachtungen während der Heimreise der Expedition von Grönland. Von Dr. Ernst Vanhöffen.

Greenland. *G. Tidskrift* **12** (1893–94): —, 113–131. **Ryberg.**

Om Erhvervs-og Befolknings-Forholdene i Grønland. Af Carl Ryberg.

Detailed discussion of the people of Greenland, with full statistics.

Greenland—Danish Expedition. **Paulsen.**

Observations Internationales Polaires. 1882–83 Expédition Danoise. Observations faites à Godthaab sous la direction de Adam F. W. Paulsen. Publiées par l'Institut Météorologique de Danemark. Tome I., Première Livraison. Copenhague G. E. C. Gad., 1893. Size 12½ × 9½, pp. 74, 62, 4. *Plates.*

The fasciculus contains separately paged memoirs on Auroras, terrestrial magnetism, and sea-temperatures between the north of Scotland, Iceland, and Greenland.

Greenland—Ruins. *Deutsche Rundschau G.* **16** (1894): 307–316. **Jiriczek.**

Nordische Ruinen in Grönland. Von Dr. Otto Luitpolt Jiriczek.

An account from Danish sources of the existing remains of the early Scandinavian occupation of the northern part of the west coast of Greenland.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Alpine Lakes. *Vierteljahrsschrift Naturforsch. Ges. Zurich* **39** (1894): 66–84. **Heim.**

Die Entstehung der alpinen Rand-Seen. Von Prof. Dr. Albert Heim.

Botanical Geography. *Ann. G.* **3** (1894): 265–277. **Bonnier.**

Leçon d'ouverture du Cours de Géographie botanique à la Sorbonne (1893–94). Par Gaston Bonnier.

This summary of the field of botanical geography will receive further notice in the Monthly Record.

Continental Growth. *Natural Science* **4** (1894): 290–298, 337–343. **Reade.**

Continental Growth and Geological Periods. By T. Mellard Reade.

This paper is noticed in the Monthly Record.

Curvature and Refraction. *Jahrbuch Schweizer Alpenclub* **28** (1892–93): 275–284. **Reber.**

Ueber Erdkrümmung und Refraktion. Von R. Reber.

Contains tables showing the effect of the curvature of the Earth in concealing distant objects, the effect of atmospheric refraction in the opposite direction, and the combined influence of curvature and refraction as actually experienced. For example, at 50 miles distance, the curvature amounts to 1647 feet below the horizon, but refraction raises an object 50 miles distant by 213 feet, so that the lower limit of visibility from sea-level at that distance would be a mountain summit 1434 feet high.

Earth's Mean Density. **Poynting.**

The Mean Density of the Earth, an Essay to which the Adams Prize was adjudged in 1893, in the University of Cambridge. By J. H. Poynting, Sc.D., F.R.S. *With Illustrations and seven folding Plates.* London, Charles Griffin and Co., 1894. Size 9 × 6, pp. xx. and 156. *Price* 10*s.* 6*d.*

Professor Poynting recapitulates the earlier experiments by which efforts were made to determine the density of the Earth, and describes in detail a new method by which he determined this constant and also the value of gravity, using a common balance and movable attracting masses acting on the balanced weights in the pans. The ultimate result was 5·4934 as the mean density of the Earth, thus confirming the generally accepted value 5·5.

Floating Islands. *Abrégé B.S. Hongroise G.* **22** (1893): 75–77. **Hanusz.**

Iles flottantes Par Etienne Hanusz.

The full paper, which occupies pp. 189–195 of the Bulletin in Hungarian, gives some account of floating islands in Russia and Hungary, which appear to have been felted masses of tree-trunks, branches, and marsh plants thinly covered with soil, not blisters of sub-lacustrine turf like the famous floating island in Derwentwater, to which, by the way, no allusion is made in the article.

NEW MAPS.

By J. Coles, *Map Curator*, R.G.S.

EUROPE.

British Isles. **Inglis.**

The Bath Road Map. Compiled by H. R. G. Inglis. Scale 1 : 126,720 or 2 stat. miles to an inch.—The Holyhead Road Map. Compiled by H. R. G. Inglis. Scale 1 : 126,720 or 2 stat. miles to an inch. Gall and Inglis, London and Edinburgh. *Presented by the Publishers.*

These maps have been reduced from the Ordnance Survey, they fold into a small space; and as they can be conveniently carried in the pocket, are specially suited for the use of pedestrians and cyclists.

England and Wales. **Ordnance Survey.**

Publications issued since April 8th, 1894.

1-inch:—

England and Wales:—175, hills photozincographed in brown, 1*s.*

6-inch—County Maps:—

England and Wales:—**Lancashire,** 110 S.W., 118 S.E. **Yorkshire,** 129 N.W., 221 N.E., 262 S.E., 263 S.E., 271 S.W., 272 N.W., 273 S.W., 281 S.E., 293 S.E., 274 S.E., 282 S.W., 1*s.* each.

25-inch—Parish Maps:—

England and Wales:—**Lancashire,** LXIX. 9, 4*s.*; 10, 11, 5*s.* each; 12, 4*s.*; 13, 5*s.*; LXX. 12, 8*s.*; LXXV. 6, 5*s.*; 13, 11*s.* 6*d.*; 14, 5*s.*: LXXVI. 1, 4, 10, 4*s.* each: LXXVII. 1, 2, 3, 4*s.* each; 4, 5*s.*; 5, 4*s.*; 6, 5*s.*; 7, 4*s.*; 9, 5*s.*; 13, 4*s.*; 14, 15, 5*s.* each; LXXXIV. 13, 5*s.*; LXXXVI. 12, 5*s.*; XCIII. 3, 5*s.*; XCIV. 16, 8*s.*; XCVII. 2, 8*s.*; 6, 20*s.* 6*d.*; 7, 11*s.* 6*d.*: 10, 14*s.*; 11, 8*s.*; CVIII. 6, 5*s.*; CXI. 5, 4*s.*; 10, 5*s.*; 11, 8*s.* **Yorkshire,** XLVIII. 2, 6, 10, 4*s.* each; 11, 3*s.*; 14, 15, 16, 4*s.* each; XLIX. 5, 9, 13, 4*s.* each; LVI. 1, 2, 5, 6, 9, 10, 14, 4*s.* each; LXIV. 1, 4*s.*; 2, 3*s.*; 6, 7, 8, 4*s.* each; LXXI. 6, 4*s.*; LXXVIII. 13, 11*s.* 6*d.*; XCVII. 8, 4*s.*; CLXVII.

6, 8, 9, 10, 11, 13, 4s. each; 15, 3s.; CLXXXIII. 5, 6, 10, 11, 4s. each; CLXXXIV. 7, 4s.; 12, 5s.; CCXIV. 12. 15, 16, 4s. each; CCXVI. 1, 3s.; 2, 4s.; 3, 5s.; 4, 6, 5, 8, 11, 4s. each; 12, 5s.; 15, 4s.; CCXXIX. 3, 8, 4s. each; 10, 5s.; 14, 5s.; CCXXX. 3, 4, 7, 8, 5s. each; 10, 4s.; 12, 11s. 6d.; 13, 4s.; 15, 16, 5s. each; CCXXXII. 5, 5s.; 15, 14s.; CCXXXIII. 4, 6, 12, 14, 5s. each; CCXLIV. 3, 4s.; CCXLVII. 3, 11s. 6d.; CCLXX. 3, 4, 12, 5s. each; CCXCIII. 7, 4s. (coloured).

Town Plans—5-feet scale:—

Ashton-under-Lyne and Stalybridge (Revision), III., XII., with houses stippled, 2s. 6d. each. Index, 4d.

Town Plans—10-feet scale:—

Middlesborough, VI. 4, 12, 13, 24, with houses stippled, 2s. 6d. each.
Plymouth and Environs (Revision), CXXIII. 7, 20, 24, with houses stippled, 2s. 6d. each. Index, 6d.
(*E. Stanford, Agent.*)

Italy. **Istituto Geografico Militare, Firenze.**

Carta d'Italia. Scale 1:100,000 or 1·8 stat. miles to an inch. Sheets:—21, Convenzioni; 32, Como; 45, Milano; 48, Peschiera; 59, Pavia; 61, Cremona; 74, Reggio Nell' Emilia; 87, Bologna; 98, Vergato. *Price 1 li. 50 centimes each sheet.* Istituto Geografico Militare, Firenze.

Italy. **Istituto Geografico Militare, Firenze.**

Carta delle Ferrovie e delle linee di Navigazione del Regno d'Italia. Scale 1 : 1,000,000 or 15·8 stat. miles to an inch. 2 sheets.

London. **Bartholomew.**

New plan of East London. By John Bartholomew, F.R.G.S. Scale 1 : 19,800 or 3·2 inches to 1 stat. mile. W. H. Smith & Sons, London. *Price 2s., mounted on cloth. Presented by Messrs. J. Bartholomew & Co.*

This map is divided into half-mile squares, and extends from Leytonstone to the Crystal Palace, and from London Bridge to Woolwich.

ASIA.

Indian Government Surveys. **Surveyor-General of India.**

Indian Atlas. 4 miles to an inch. Sheets: 30, Parts of Districts Lahore, Kapurthala, etc. 73, Parts of Districts Wardha, Amraoti, etc. 76, Guntur, Devarkonda, etc.—Quarter Sheets: 87, S.E. Gonda Fyzabad, etc. 91, N.E. Bilaspur, Raigarh, etc. 129, S.W. Sibsagar, Lakhimpur, etc. 130, N.E. Sibsagar, Naga Hills, etc.—India with Hills, 1 inch to 64 miles, corrections to 1893, 4 Sheets.—India without Hills, 1 inch to 28 miles, additions and corrections to 1893.—Bombay Survey, Sheet No. 274, 1 inch to a mile, Part of District Belgaum. Season 1890-91.—Bengal Survey, 1 inch to a mile. No. 105, Angul Estate (Orissa). Season 1888-89.—Assam Survey, No 114, 1 inch to a mile. Parts of Lakhimpur and Sibsagar. Seasons 1866-73. No. 129, Part of Lakhimpur. Seasons 1867-73. No. 130, Part of Lakhimpur. Seasons 1867-73.—Madras Survey, No. 331, 1 inch to a mile. Parts of Bastar N. State and Jeypore Zemindary. Season 1868-69.—Upper and Lower Burma Surveys, 1 inch to a mile. No. 186, Districts Bassein and Thongwa. Seasons 1881-89. No. 189, Districts Bassein and Thongwa. Seasons 1886-91. No. 264, District Kyaukse. Season 1889-90. Index Map to the Sheets of the Survey of Upper and Lower Burma, 1 inch to 64 miles, 1893.—South Eastern Frontier, 1 inch to 4 miles. No. 1, N.E. Upper Chindwin, etc. Seasons 1886-92.—Provinces of Bengal, Behar, Orissa, and Chota Nagpur, 1 inch to 16 miles, 1892, 2 Sheets—Provinces of Bengal, Behar, Orissa, and Chota Nagpur, 1 inch to 32 miles, 1892.—His Highness the Nizam's Dominions including the Assigned Districts of Berar, 1 inch to 16 miles, 1891, 2 Sheets.—Benares Division, 1 inch to 4 miles, 1893. 2 Sheets.—Darjeeling District, 1 inch to 4 miles, 1893.—Assam in 9 Sheets, 1 inch to 8 miles. Sheets No. 1, Bhutan, etc. No. 3, Parts of Districts Lakhimpur and Sibsagar, etc. No. 5, Parts of Districts Kamtrup, Darrang, etc. No. 6, Parts of Naga Hills. Nos. 7 and 8 (on one Sheet), Parts of Districts Sylhet and Cachar, Manipur, etc., Corrections to 1891-93.—The Province of Assam, 1 inch to 16 miles, Corrections to 1891. —*Presented by H. M. Secretary of State for India, through India Office.*

AFRICA.

Mozambique. **Commissão de Cartographia, Lisbon.**

Cartados Districtos de Lourenço Marques e de Inhambane, Provincia de Moçambique, 1893. Scale 1 : 1,000,000 or 15·7 stat. miles to an inch. *Presented by Commissão de Cartographia, Lisbon.*

On this map all the boundaries of districts in the Province of Mozambique, and the routes followed by Portuguese explorers are laid down, the positions of military posts, missions, light-houses, and villages are shown, and a large amount of detail with regard to the topography is given.

Prince's Island. **Commissão de Cartographia, Lisbon.**

Carta da Ilha do Principe—2A edição. Scale 1 : 100,000 or 1·8 stat. miles to an inch. *Presented by Commissão de Cartographia, Lisbon.*

West Africa. **Kiepert.**

Die neue Grenze Kamerun's gegen das englische Niger-Bennë-Gebiet (Abkommen vom 14 April und 15 November 1893). Scale 1 : 3,000,000 or 47·8 stat. miles to an inch. Aus R. Kiepert's Deutschem Kolonialatlas für den amtlichen Gebrauch in den Schutzgebieten. Geographische Verlagshandlung Dietrich Reimer in Berlin, Inhaber : Hoefer & Vohsen, 1893.

This is a sheet of Kiepert's 'Deutschen Kolonialatlas,' on which the boundary settled between the English and German territories in the Niger and Benue region. A note on this subject appeared in the *Geographical Journal* for May, 1894.

AMERICA.

Argentine Republic. **Delachaux.**

Mapa Mural de la Provincia de Buenos Aires, 1893. Scale 1 : 600,000 or 9·5 stat. miles to an inch. Construido bajo la direccion le Enrique Delachaux. Impreso en los Talleres de Publicaciones del Museo de La Plata (Sección de Cartografia). 6 sheets.

This is a very complete map of the province of Buenos Ayres, on which all the railroads, telegraphs, and roads have been brought up to date; and other items of information with regard to agricultural centres, importance of towns, etc., are indicated by symbols. At the foot of the map a table is given, arranged in alphabetical order, the areas, elevations above sea-level, and population of each division of the province, and insets of the Argentine Republic, the principal lines of ocean steamers which call at Buenos Ayres, and a plan of the port of La Plata.

Mexico and Guatemala. **Sapper.**

Krater-Typen in Mexico und Guatemala. Nach Aufnahmen von Dr. Carl Sapper, 1892 und 1893. Petermann's Geographische Mitteilungen, Jahrgang 1894, Tafel 8. Justus Perthes, Gotha. *Presented by the Publisher.*

North American Lakes. **Harrington.**

Currents of the Great Lakes as deduced from the movements of bottle papers during the seasons of 1892 and 1893. By Mark W. Harrington, chief of the Weather Bureau. Published by authority of the Secretary of Agriculture. Washington, D. C. Weather Bureau, 1894. *Presented by the Chief of the U. S. Weather Bureau.*

This atlas consists of six maps illustrating, by means of coloured lines, the direction and speed of the currents of the Great Lakes of North America. Early in 1892 the United States Weather Bureau published a wreck chart of the Great Lakes, a striking feature of which was the clustering of wrecks in certain parts of the surface of the lakes. This suggested that unknown currents might play a considerable part in the wreckage, and steps were at once taken to ascertain if such currents existed and what they were. The method pursued was that which has been frequently employed in the study of ocean currents, and is as follows:—A bottle containing a paper on which the date and place were written is thrown overboard at some definite point and left to float freely, and when picked up the enclosed paper is marked with the date and place of finding. In this way two points on the line of current were determined, and by employing a considerable number of bottles the general direction and speed were shown. The maps are accompanied by introductory letterpress containing much interesting information.

United States and Canada. **Rand, McNally & Co.**

Indexed County and Railroad Pocket Map and Shippers' Guide of—

Arkansas,	scale 1 :	850,000	or 13·4	stat. miles to an inch.	
Georgia,	„ 1 :	950,000	„ 14·4	„	„
Illinois,	„ 1 :	950,000	„ 14·4	„	„
Indiana,	„ 1 :	700,000	„ 10·7	„	„
Kentucky,	„ 1 :	1,150,000	„ 18·1	„	„
North Dakota,	„ 1 :	1,350,000	„ 21·3	„	„
Ohio,	„ 1 :	830,000	„ 13·1	„	„
Ontario,	„ 1 :	1,120,000	„ 17·6	„	„

Rand, McNally & Co., Chicago and New York. New Editions, 1894. *Price 25 cents each.* ***Presented by the Publishers, through E. Stanford, Esq.***

These are new editions of a series of maps, which are in course of publication by Rand, McNally and Co. Each map is accompanied by an index containing much information that will be useful to persons visiting the United States on business or for pleasure.

PACIFIC OCEAN.

Pacific Islands. **Pfeil.**

Joachim Graf Pfeils Durchquerungen von Neu-Mecklenburg im Jahre 1888. Nach den Aufnahmen des Reisenden entworfen von P.L. Scale 1 : 200,000 or 3·2 Statute miles to an inch. Petermann's Geographische Mitteilungen, Jahrgang 1894 Tafel 7. Justus Perthes-Gotha. ***Presented by the Publishers.***

GENERAL.

Ancient Atlas. **Spruner-Sieglin.**

V. Spruner-Sieglin, Hand-Atlas zur geschichte des Altertums, des Mittelalters und der Neuzeit. I. Abteilung: Atlas Antiquus. Atlas zur geschichte des Altertums. 34 kolorierte Karten in Kupferstich enthaltend 19 übersichtsblätter, 94 historische Karten und 73 Nebenkarten. Entworfen und bearbeitet von Dr. Wilhelm Sieglin. Dritte Lieferung. Gotha Justus Perthes. ***Price 2 M. 50 Pf. each part.***

The third part of this atlas contains the following maps: Palestina et Phoenice, Graecia quinto a. Chr. saeculo, Italiae pars Septentrionalis, and Hispania. The maps are very clearly drawn, and are excellent specimens of cartography.

Historical Geography. **Schrader.**

Atlas de Géographie Historique. Ouvrage contenant 54 Grandes Cartes doubles en couleurs, accompagnées d'un Texte Historique au dos et d'un grand nombre de Cartes de Détail, Figures, Diagrammes, etc. Par une Réunion de Professeurs et de Savants, sous la direction géographique de F. Schrader Directeur desfravaux cartographiques de la librairie Hachette et C^ie^. Paris : Librairie Hachette et C^ie^. Part 6. Price 1fr. 50c. ***Presented by the Publishers.***

The present issue of this atlas contains a map of the Carlovingian Empire, with insets of England under the hegemony of Egbert King of Wessex, and Spain at the death of Alfonso I. The Holy Empire illustrated by three maps. Europe in the time of Napoleon 1810, with insets of France showing political divisions in 1802, and of Germany at the end of 1806. Each map is accompanied by explanatory letterpress, illustrated by small maps and plans.

CHARTS.

United States Charts. **U.S. Hydrographic Office.**

No. 1407, Chiri-Chiri Bay, Pacific Coast of Colombia.—No. 1406, Mandinga Harbor, Gulf of San Blas, Atlantic Coast of Colombia.—1405, Columbia Bay, Gulf of Darien.—1410, San Miguel Bay and Darien Harbor, with the Savannah and Tuyra Rivers.—No. 1400, Pilot Chart of the North Atlantic Ocean, April 1894. Published at the Hydrographic Office, Bureau of Navigation, Navy Department, Washington D.C. Charles Sigsbee, Commander U.S.N. Hydrographer. ***Presented by U.S. Hydrographic Office.***

PHOTOGRAPHS.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

90
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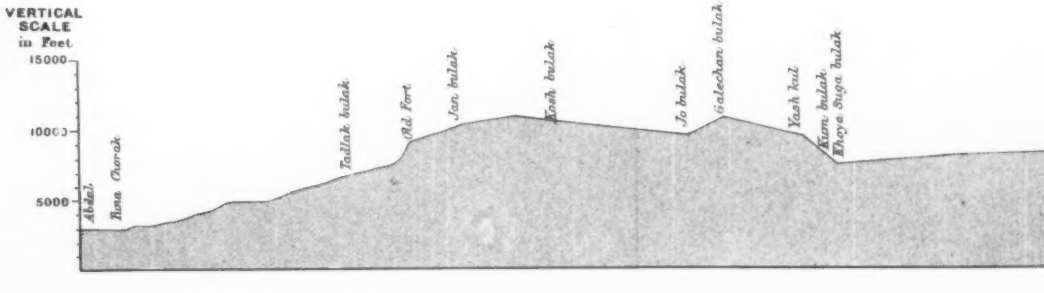
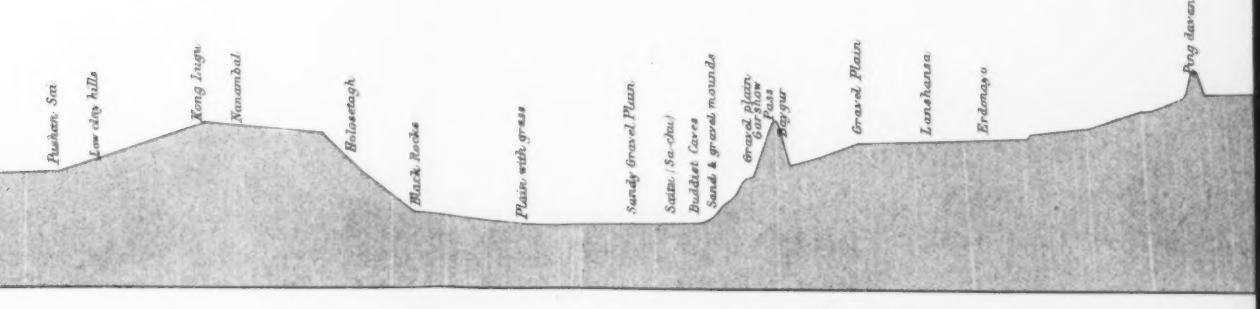
39
38
LOB NOR
Abdal 3111
Tuna Chorak
Ishkeli bulak
Sandhills
Gravel Plain sloping to Lob Nor
Kurghan bulak
Tadlak bulak 8671
7900
Old Fort
Jan bulak 10445
Dry steep gorge
Kosh bulak
Broad Valley
Mts sinking into sandy hills
Galechan bulak
19816
Jo bulak
9882
Yash kul
Khoya Suga bulak
7762
Kum bulak
Snowy Peaks
Pass
A l t y n
Broad Valley
Long Ri
D e
7844
Black
BLACK SEA
Batum
Ellis
RAILWAY
Baku
CASPIAN SEA
Tsun-ada
RAILWAY
RUSSIAN DOMINIONS
Tian Shan
Aksu
Samarkand
BOKHARA
PAMIR
AFGHANISTAN
I N D I
FROM BATUM TO PEKING
SCALE OF MILES
90
91
92


VERTICAL SCALE in Feet
15000
10000
5000
Abdal
Tuna Chorak
Tadlak bulak
Old Fort
Jan bulak
Kosh bulak
Jo bulak
Galechan bulak
Yash kul
Kum bulak
Khoya Suga bulak

LONGITUDINAL SECTION FROM ABDAL TO HSI-NIN



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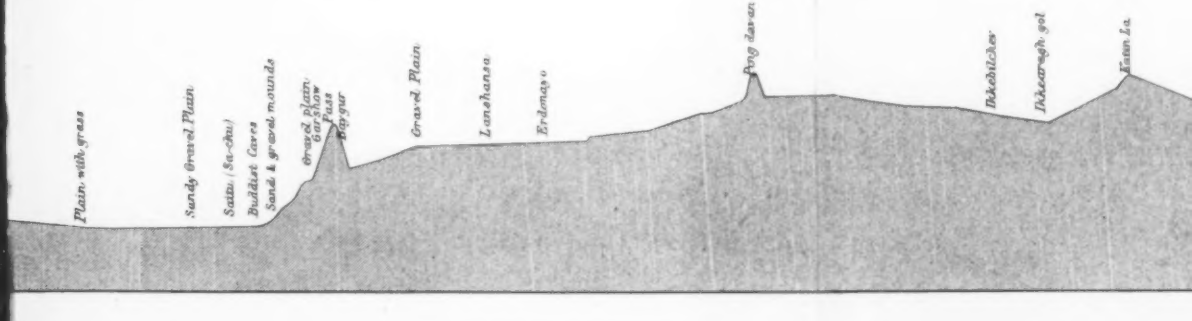
GITUDINAL SECTION FROM ABDAL TO HSI-NING.



Published by the Royal Geographical Society.

MAP

TO ILLUSTRATE THE JOURNEY OF

MR ST. GEORGE R. LITTLEDALE

FROM

LOB NOR TO KOKO NOR

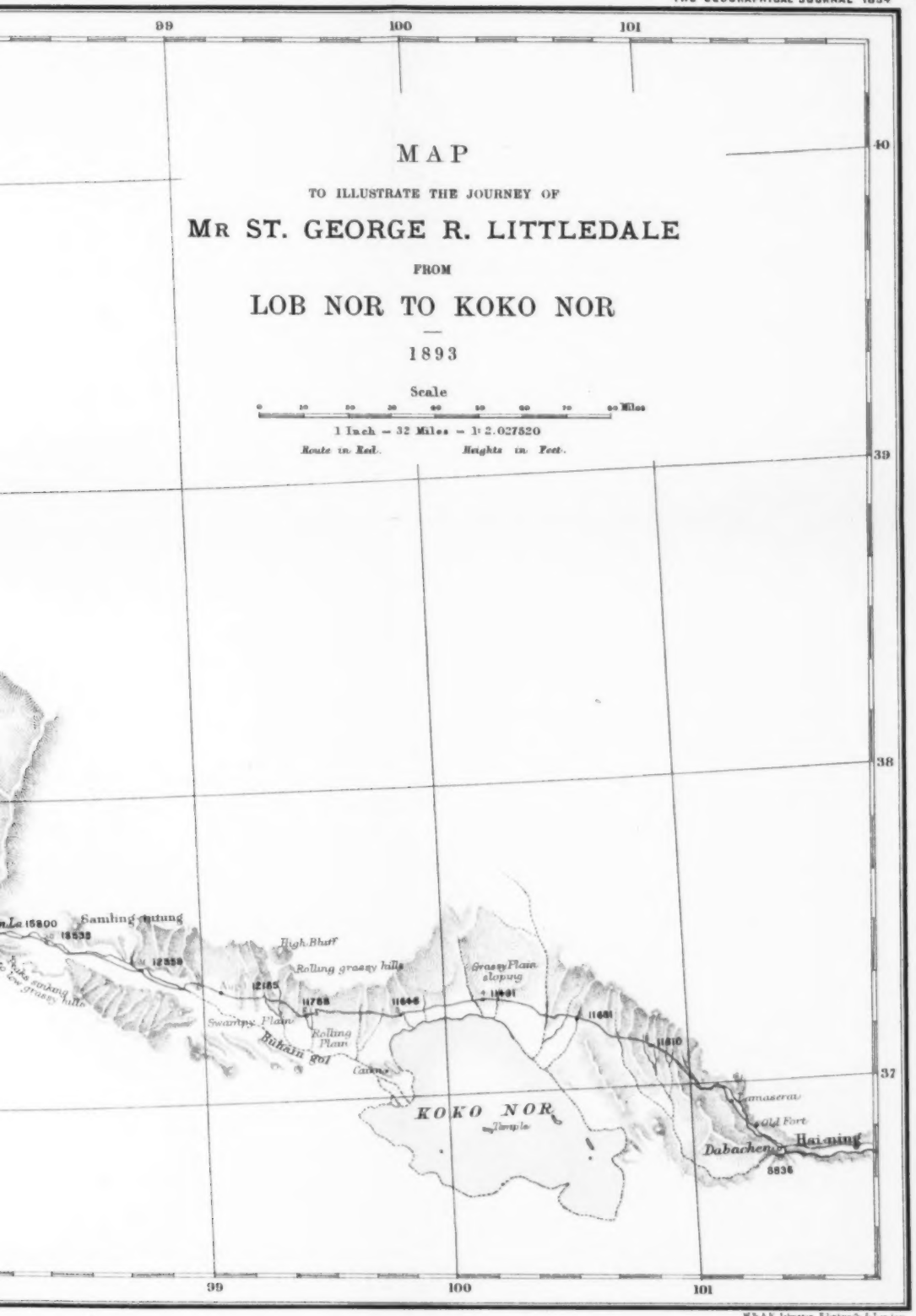
1893

Scale

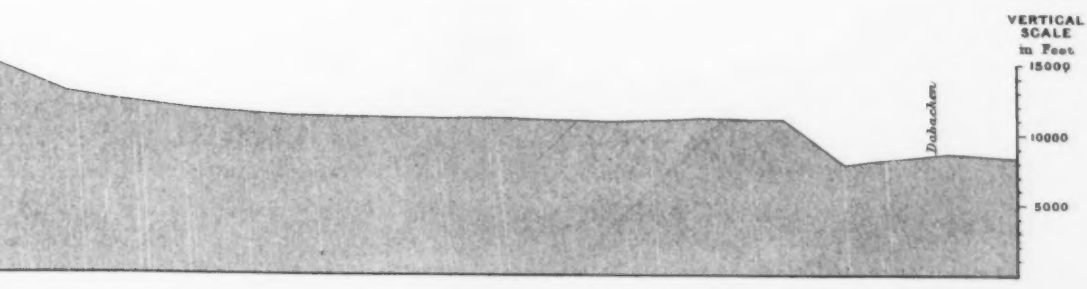
0 10 20 30 40 50 60 70 80 Miles

1 Inch = 32 Miles = 1 : 2,027,520

Route in Red. *Heights in Feet.*



W. & A.K. Johnston, Edinburgh & London.



Published by the Royal

MAP OF
THE RIVER HOANG HO
(YELLOW RIVER)

FROM

LAN-CHAU-FU TO BAUTU

Constructed from Observations

TAKEN BY

Mr ST. GEORGE R. LITTLEDALE

1893

Scale

0 10 20 30 40 50 60 70 80 Miles

1 Inch = 32 Miles = 1:2,027,520

W. & A.K. Johnston, Edinburgh & London.

Royal Geographical Society.

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The Western Mexico Mission.

A FEW DETAILS.

THIS mission was begun in 1872, by Mr. and Mrs. Watkins and Mr. Stephens. On March 2d, 1874, Mr. Stephens was killed by mob violence. In June following, Mr. Morgan, from California, joined this mission. He remained about a year, and retired. Mr. and Mrs. Edwards, from Wales, joined the mission in April, 1874. All the above were of Welsh extraction. The mission had been planned in the hope of its being prosecuted by Welsh Christians, and so interesting Welsh churches of this country. In the course of the year 1877, Mr. and Mrs. Watkins were obliged to return to this country on account of their health, and Mr. Edwards was left alone. He remained alone during the year 1878.

Early in 1879, Mr. and Mrs. Watkins returned to the field, accompanied by Mr. and Mrs. Kilbourn, and plans were entered upon for enlarging the work; but before the close of the year Messrs. Kilbourn and Edwards, unable to work with Mr. Watkins, who had excited a strong prejudice against them, and led them to feel that their usefulness was at an end, were constrained to resign, and Mr. Watkins remained in charge of the field. But his course and its results were so unsatisfactory to the Prudential Committee, that it was felt necessary to relieve Mr. and Mrs. Watkins of further care, and to reconstruct the mission on a wholly new basis. In the autumn of 1881 Mr. Watkins was therefore asked to turn the work over to missionaries upon their arrival. Mr. Watkins, however, without consultation upon the matter with the Prudential Committee, entered into negotiations with the Southern Methodists to occupy Guadalajara, and they made arrangements to do so. Their agent was despatched to Guadalajara, and their intentions made public in the community, and services announced. About a month after this, a telegram was received by the American Board, from the superintendent of the Southern Methodist Mission in Mexico, inquiring if the Board would transfer this field to the Southern Methodists. They were informed that the Board had no intention of abandoning the field, and could not consent to any such transfer; but had a missionary under appointment, and soon to be on the way. Mr. Crawford,

the first new missionary of the Board, arrived on the ground early in 1882. Later, Mr. and Mrs. Howland, accompanied by Miss Haskins, joined the mission, and were followed some time later by Mr. and Mrs. Bissell. Though the results of former labors in Guadalajara and vicinity were thus largely appropriated by another Society, the importance of this part of Mexico, and preparations made in former years to occupy it, seemed to require further efforts on the part of the Board; and new missionaries were accordingly sent with instructions carefully to avoid any complications with those on the ground. It was found that there were individuals, here and there, who had remained loyal in their attachment to the American Board, and who desired at once to be brought into relations with these missionaries. Any movement of theirs, however, in this direction, excited bitter opposition on the part of those with whom they had been associated. Such as were church-members and in regular standing, on asking letters of dismission, were refused, and in the end, excommunicated. After waiting, and doing everything possible in the interest of peace, the missionaries deemed it proper to receive such as gave evidence of Christian character, on profession of their faith, into new organizations.

There is ample room for the work of both the Methodists and the missionaries of the American Board, without unpleasant competition with each other. It is believed that the missionaries of the Board have been faithful to their instructions to observe Christian courtesy, and to avoid every possible cause of offence in doing their own work; but with their best endeavors they have not succeeded in escaping misrepresentation and hindrance to any efforts they may make, both at Guadalajara and elsewhere.

This is a brief statement of the situation. It is hoped that with time, and quiet perseverance in well-doing, churches may be established — well grounded in the faith, well instructed in the duties and privileges of the Christian life — that shall take their part in the evangelization of Mexico. It is greatly to be regretted that there should be such unfriendly opposition; but the interests at stake seem to require faithful persistent effort on our part.

SECRETARIES OF A. B. C. F. M.,

Boston, Oct. 1, 1884. *For the Prudential Committee.*